

A STRATEGIC PRODUCT / MARKET
ANALYSIS OF THE SEMS MICRO S/1

INPUT EUROPE

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**A STRATEGIC PRODUCT/MARKET ANALYSIS
OF THE SEMS MICRO S/1**

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I. INTRODUCTION

I. INTRODUCTION

- This study was commissioned by M. TOUBOUL of SEMS on the 18th April 1979.
- The basis of the analysis were 80 end-user interviews with large/very large companies in France, West Germany, Belgium and Holland, 28 system/software houses (SSCI) interviews, 8 competitor vendor interviews and 3 third party maintenance (TPM) interviews.
- Two interim presentations were given to SEMS in Louveciennes on May 8th and June 19th, and a final presentation made on July 10th, 1979.
- Exhibit I-1 details the breakdown of the interview programme by country.
- Although many of the charts are labelled, for convenience of title, "Europe", they in fact only relate to the four country markets analysed. In reality there is no such market as "Europe" anyway, and market plans for any product must be prepared on a country by country basis.
- The results of the study cover all conceivable aspects of a new, low-end minicomputer addition to the S series, which extends the current S-1 and intended S-2 products downwards to a Micro S/1. This report does not apply to a cost-reduced version of existing products covering existing markets.
- An effort has been made to view the Micro S/1 as an integral part of an S series product line that has a standard range of peripherals, system software, languages etc, rather than as a separate, isolated product that responds to a separate isolated market.
- INPUT stresses the need for this approach, since SEMS already has too many isolated products in both the Solar and Mitra ranges. SEMS must restrict its new product announcements to match a line strategy, leaving out those items that, although attractive, do not fit into the line definition established by SEMS.

EXHIBIT I-1

INTERVIEW PROGRAMME

USERS	SCHEDULED	ACTUAL	DISCARDED
FRANCE	35	36	24
W. GERMANY	35	36	15
BENELUX	10	8	12
TOTAL	80	80	51
SYSTEMS/SOFTWARE HOUSES			
FRANCE	12	12	3
W. GERMANY	12	12	1
BENELUX	4	4	2
TOTAL	28	28	6
VENDOR	8	8	-
3RD PARTY MAINTENANCE	3	3	-

- In the same way, a Micro S/I announcement must make use of existing S-I hardware, at the same level of performance, using the same software. However, providing a packaged approach is used, the end-user prices for this common hardware do not have to be identical to the existing catalogue prices.
- Country end user attitudes vary enormously:
 - in France, end users do not have a clear idea of their requirements, nor of the selection or usage criteria they apply to a minicomputer purchase; however SEMS, as a French supplier, has an enormous advantage over all other vendors (except IBM),
 - in West Germany, the over-riding consideration is whether the product is capable of solving the problem, and offering good reliability; price is important, but secondary.
- Efforts have been made to include as much of the data collected during the study as possible. When interpreting the charts offered, SEMS must be careful not to attach too much importance to minor variations in percentages.
- It was originally intended that certain application-oriented vertical markets would be identified by the study. However, when the interviews were completed it became obvious that application software was not a mandatory requirement, and that low price for the right hardware was the prime need. Emphasis has therefore been put on defining packaged configurations of hardware and software in place of the applications sections.

II. EXECUTIVE SUMMARY

II. EXECUTIVE SUMMARY

A. MINICOMPUTER MARKET CHARACTERISTICS

- In assessing the logic of introducing the Micro S/1 low end minicomputer into the S-series, the established trends of the minicomputer market are essential.
- During the commercial lifetime of the product, the performance, price, user characteristics etc, of competitive products will change rapidly, impacting the Micro S/1. It is important, therefore, that the decision to announce the Micro S/1 be taken in the context of the low-end minicomputer market over the next three years, rather than based on conditions that apply today.
- The minicomputer market has gradually moved to a "war of iron" where continuous price cutting, at a rapid pace, is implemented in conjunction with gradually improved hardware performance, driven solely by the anxiety of vendors to appear "competitive".
- In so doing, they are continuously leap-frogging themselves, driving prices down at a rate not demanded by the user. The consequences are:
 - there is a constant race for new technology improvements, higher integration and cost saving measures to enable each vendor to momentarily edge ahead,
 - only those manufacturers who are most efficient will be able to stand the pace; others must adopt defensive measures that safeguard margins until prices stabilize.
- The low-end minicomputer market is where this trend is the most visible. Here products are stripped down to their most competitive, reducing margins to a minimum, in the hope of expanding market penetration and building a customer base.

EXHIBIT II-1

MICRO S/I MARKET ENVIRONMENT

- Product price is a key item:
 - must be competitive
 - must achieve 30% margin, (or OEM market should be abandoned)
 - must be reviewed, in line with costs, regularly.
- Reliability is a key item:
 - must meet basic minimum of MTBF
 - should not place a strain on field maintenance force
 - response time & MTTR are the user's evaluation criteria.
- Market is slowly moving towards functional products:
 - dedicated systems that have a single role
 - system and application software in firmware
 - hermetic packages that have no support after initial installation
 - this stage has not been reached yet but may appear in the lifetime of the MICRO S/I.
- Competition will be greatest in the ability to expand market coverage, market expansion and vendor viability.
- Life cycle of all information processing products is shortening: commercial life cannot be expected to exceed 5 years now, and with low-end mini will probably be 3 years.

- In order to simplify the administration and reduce costs of marketing, selling, supporting and maintaining low-end products, clean, modular configurations are necessary. This also enables easier control of the operation as an entity, making sure that adequate margins are maintained, as market prices and in-house costs fluctuate.
- Sales volume will be relatively easy to achieve, given the continuing demand in the marketplace. The challenge will be in making a profit.
- The low-end product market is a dangerous one: it is a low margin area for all vendors, by definition, but in addition it is a high volume market; consequently the slightest miscalculation on unit margin can be rapidly transformed into sizeable losses.
- Application software need not be systematically offered; indeed it is better if basic configurations are priced without it, leaving this area to the users and/or SSCI. This does not mean that vertical markets cannot be found which can be serviced by a dedicated package, but application software development should be kept to a minimum unless a clean target for multiple systems is secured.
- Typical system manufacturing costs will need to be targeted at 35% of sales price level. This will allow for discounts (which will be up to 20% of the catalogue price for volume sales), and the higher relative costs of marketing, supporting and maintaining these low cost products.
- If SEMS cannot match this target, they should buy in, from reputable OEM sources, those product items which exceed their target cost. This provides an on-going solution, (rather than a one-off solution), since SEMS can profit from technology changes as they occur rather than being concerned with tooling investments, available factory space, personnel re-training/expertise etc.

EXHIBIT II-2

MICRO S/1 MARKET OBJECTIVES

- MAINTAIN CURRENT MARKET COVERAGE:
 - SEMS must offer a complete range of minicomputers, respond to competitive moves (DEC in particular)
- IMPROVE MARKET SHARE:
 - penetrate new markets, foreign and domestic,
 - not lose any major development opportunity,
 - market share by number as well as value.
- DEVELOP SEMS KNOW-HOW
 - through product technology,
 - personnel involvement with all sizes of products, markets, clients.
- ROUND OUT THE S LINE:
 - develop pyramid of S-Line users,
 - develop compatible hardware/software line,
 - develop compatible file/procedure systems.

B. MICRO S/1 MARKET OBJECTIVES

- The introduction of the Micro S/1 can have many strategic goals:
 - SEMS may feel that it is necessary for it to offer a complete range of minicomputers, and, as the market is expanded upwards or downwards by the competition, SEMS must follow,
 - SEMS must penetrate new markets, both foreign and domestic, maintaining its market share by number of units as well as by value, and ensuring that no major minicomputer market opportunity is lost,
 - practical experience of a market, user needs and the technology(ies) involved are not easily nor quickly absorbed: involvement with the product market from the start ensures that SEMS' know-how progresses with the market,
 - the development of an S line user base should follow the classical pyramid approach of large numbers of small machines topped by a decreasing number of increasingly large machines,
 - the Micro S/1 must show evidence of the development of a compatible line of S products: similar peripherals, basic software and languages must be used on the Micro S/1 as on the S-1 and prospective S-2; this compatibility must be apparent to the user who should find compatible file storage and file structures (software), compatible data capture methods and software, and compatible operational procedures on all models of the line.

C. STRATEGIC CHOICE FOR SEMS

- Before assigning a strategic role to the Micro S/1, however, it is necessary for SEMS to examine its own role, as a company, in the minicomputer market:
 - is SEMS a hardware manufacturer? If so, each product it produces must be profitable in its own right, without depending on software to adjust the margin;
 - is SEMS a system vendor? If so, whatever the source of hardware (own manufacture, OEM) each system should be profitable;
 - does SEMS want to become a systems/software house? This would mean expanding its knowledge of user requirements and concentrating energies on systems implementation support and applications; (however this appears to be politically unacceptable).
- This report contends that SEMS should continue to be essentially a hardware manufacturer for the majority of its products but will increasingly need to become a systems vendor (or hardware integrator); for the immediate future this concerns the low end systems and peripherals, where inadequate margins can be generated by own manufacture.
- This selective strategy means that SEMS should:
 - maintain the STATUS QUO for the medium and large minicomputer systems, (and maintain control on margins for each product item),
 - become a hardware integrator for the Micro S/1, using OEM peripherals and/or CPU/memory,
 - use existing marketing and sales strengths to sell a packaged Micro S/1 and promote it as an integral part of the S line "a la Honeywell".

EXHIBIT II-3

SUGGESTED S LINE PROFILE

- **LOW END:**
(Micro S/1)
 - small number of basic configurations, (3)
 - limited number of options,
 - limited basic software, no applications
 - limited number of languages
 - very wide distribution, heavy involvement of SSCI and other OEM
 - low margin, high volume,
 - low revenue earner, low profit
 - market development, (new accounts)
- **MEDIUM SCALE :**
(S-1)
 - low number of basic configurations
 - large number of options
 - full basic software, applications
 - SEMS distribution mainly, some OEM
 - good margin, high volume
 - high revenue, good profit earner
 - market "occupation"
- **LARGE SCALE :**
(S-2, S-3)
 - high number of basic configurations
 - large number of options
 - full application software
 - SEMS distribution only, no OEM
 - very high margin, low volume
 - average revenue earner, high profit
 - market expansion
- **ALL :**
 - same file handling procedures
 - same data capture procedures
 - total basic software and language compatibility
 - same storage peripherals (or subset)
 - same input devices (or subset)

D. SUGGESTED S-LINE PROFILE

- Exhibit II-3 summarizes the suggested S-line profile, which normalizes the role to be played by each model and describes their product and market characteristics:
 - the Micro S/1 is the product used to develop the market by opening new accounts for SEMS with a small number of basic configurations with limited options, limited software, no standard application packages (only selected vertical market packages) and limited languages; the Micro S/1 should be very widely distributed, by SEMS, the SSCI and other third parties, aiming at maximum penetration and high volume sales;
 - the S-1 would have the role of market occupation and would be offered with extensive options of hardware and software; it represents the lower limit of full commitment by SEMS in applications, support and basic software; it is the "bread and butter" model with high volume sales and good margin, distributed mainly by SEMS;
 - the S-2 (and perhaps S-3) are the tools for market expansion, i.e. the maximizing of revenue from established accounts with large configuration needs, exclusively distributed by SEMS.
- The contribution of the Micro S/1 to unit sales would be very high; to sales value, revenue and profit would be low; unit margin would be very low. The S-1 contribution to unit sales, sales value, revenue and profit would all be high. Unit margin would be average. The contribution of the S-2 and S-3 would be low in unit sales, average in sales value, revenue and profit, but margins would be very high.
- All models of the S-line should possess the same file handling procedures, same data capture/handling software, complete basic software and language compatibility and users should recognize the operational procedures as being "S-line". Wherever possible, the peripheral catalogue should be the same, (although the Micro S/1 may require a set of OEM devices to reach the required margin).

E. DISTRIBUTION CHANNELS ARE KEY

- The high volume sales that must be sought for the Micro S/1 should make use of all of the distribution channels available. DEC's approach to aggressive marketing of low-cost, good performance hardware, in this regard is a model.
- New channels for very small systems are slowly opening up which may prove interesting for the future, but that are currently of low value to minicomputer manufacturers:
 - computer shops (i.e. retail outlets specializing in mini/small computers in kit or system form, which provide product selection advice, systems, upgrades and maintenance); these are developing in the U.S., but have not taken off in Europe yet,
 - office product dealers/agents, who view the adoption of the representation of computer hardware as a step up in status, however small the computer.
- Systems/software houses are a growing source of product sales, although few, numerically, have committed themselves to this area of the market. Out of the 1000 systems/software houses in Europe, approximately one third sell significant numbers of hardware systems; the remainder offer standard or customized software for existing installations of all sizes of system.
- It is important that SEMS adopt an "open arms" policy towards the SSCI community, who should provide 40% of total unit sales.
- An example of this approach is Honeywell in the U.K., who with a small dedicated "level 6" team, sold over 100 systems through SSCI in the first year of operations. They adopted the "leads and feeds" method, where Honeywell staff salesmen provide the sales leads, (which are directed to one or more of a selected list of SSCI according to geographic location and expertise) and then monitor the agreement between end-user and SSCI, providing maintenance services only.

EXHIBIT II-4

SSCI APPROACH

- Individual contracts, on OEM terms.
- Has Application Software expertise : choose by sector speciality.
- Brand loyalty and contracts with other suppliers are not binding.
- Has own sales force of software/industry sector specialists.
- Very frequently invited by users to tender, in place of equipment vendor.
- There are over 1000 SSCI in Europe who have minicomputer interest/expertise.
- Sample of the success of this approach :
 - Honeywell in U.K. sold 100 systems through SSCI in start up year of level 6 sales
 - have adopted "leads and feeds" method.
- Good demonstration and support facilities required.

- This requires good sales support facilities including one or more demonstration centres and good promotion support.

F. ESTIMATED COST BREAKDOWN COMPARISONS

- It is highly speculative to compare cost breakdowns between manufacturers; conditions are different, the effect of volume is enormous, the value of the company name is important, and the synergy obtained from company activities in other industries can be significant.
- Nevertheless INPUT presents, in Exhibit II-5, the cost breakdown estimates for IBM (Series 1 activity only), DEC and SEMS.
- The Series 1 manufacturing cost may be lower than the 25% of sales price indicated now that volume production is underway, since IBM now allows discounts. DEC's average manufacturing cost is given as 44%, but this is based on invoiced sales and not catalogue sales (the difference being the average discount allowed); thus the 44% would be lower based on catalogue prices.
- SEMS manufacturing cost is not defined in the same way, but corresponds to the PCI. It may be higher than the value indicated, which emphasizes the problem SEMS is facing: in efficient production and/or excessive production costs.
- The important point is that whereas IBM is experiencing margins of the order of 20% and DEC's margins are of the order of 10%, SEMS' margin is negligible.
- This suggests that any move towards a mix of products (which includes a low-end minicomputer with very low margins) will result in a deterioration of SEMS current marginal profit situation.

EXHIBIT II-5

MINICOMPUTER VENDOR ESTIMATED COST BREAKDOWN
BY CATEGORY AVERAGE % OF SALES

	<u>IBM (S/I)</u>	<u>DEC</u>	<u>SEMS</u>
Manufacturing Cost	25 (2)	44 (2)	50 (1)
R & D	12	8 (1)	10
Marketing	15	10	15
Tech. Support	10	16	15
Maintenance	10	16	20 (2)
Overhead	11	12	5 (1)
Margin	17 (1)	10	(negligible)

(1) may be higher
(2) may be lower

G. RECOMMENDATIONS

- INPUT believes that it would be a very dangerous step for SEMS to enter the Micro S/l market:
 - the current financial equilibrium of SEMS would be adversely impacted by the entry into this very competitive, low margin market, where sales costs and support costs are high,
 - it is not evident, from the data supplied by SEMS, that SEMS can (i) manufacture the required product at a sufficient margin (ii) obtain manufacturing cost reduction by high volume sales (apparently never achieved in the history of SEMS),
 - SEMS does not operate an analytical financial analysis by product line, and would not be able to measure the impact of the Micro S/l (and could not therefore control the products' costs).
- If strategic, political or other imperative reasons force SEMS into this market, then INPUT strongly recommends that a detailed cost analysis of each catalogue item be undertaken to ensure that either adequate margins can be obtained for each (i.e. that manufacturing cost be no higher than 35% of sales price) or that OEM purchase be undertaken with a reputable supplier (e.g. Texas Instruments for CPU and memory). If neither OEM nor own manufacturer sources can supply the required level of margin, then the product introduction should be postponed until they can.
- When product introduction has been obtained, rigid cost guidelines should be employed for marketing, support, installation, application software development and maintenance and each item monitored (ideally this is done by a product manager).
- SSCI sales opportunities should be limited to those which generate profit and the discount structure applied accordingly.

- Application software should be restricted to those vertical markets where a single package or groups of packages can be justified over an adequate volume of identical prospects.
- When constructing the Micro S/l catalogue, maximum use of the existing MITRA/SOLAR/S peripherals, options and software should be made. In other words it is essential that each decision taken in regard of the Micro S/l be reflected on the other members of the S-line, (both existing and planned). Where discrepancies occur, there should be significant justification for diverging from the S-line norm.
- INPUT emphasizes the fact that a SEMS entry into this low-end minicomputer market appears to be dangerous more for the company's financial health, which cannot be justified as the basis of "future expansion", or "completing the S-line" etc. With minicomputer prices dropping continuously, the time will come for most of SEMS competitors to find they cannot afford to follow. Those that continue without due regard to margins will simply endanger their continued existence.

III. DESCRIPTION OF THE IDEAL MICRO S/1

III. DESCRIPTION OF THE IDEAL MICRO S/1

- The end-user and system/software house interviews, discussed in section V, provide a detailed description of each major aspect of the Micro S/1. This section summarizes those findings in the shape of recommended configurations and the price, software, distribution and support characteristics of the Micro S/1, as they have jointly defined them.

A. MICRO S/1 PRODUCT ENVIRONMENT

- The Micro S/1 is intended as an integral part of the S-line and not as an isolated product; therefore it cannot be used as a generalized product for use by other hardware vendors to integrate into their lines, (particularly since a Micro S/1 of SEMS manufacture would not offer margins that are sufficiently large).
- Thus SEMS is the only company who should "sell" the Micro S/1, but SEMS should not be the only company that distributes the product. The recommended mix of units distributed is that SEMS should achieve 60% of direct end user sales and system/software house distribution should achieve 40% of the units distributed.
- In most cases the prospects will be generated by SEMS' sales force, but it is increasingly found that end users who have previously dealt with a system or software house refer to them for the choice of new hardware, rather than to the manufacturer.
- It is likely that SEMS will be involved in 80% of the end-user installations, since the SSCI and most end users require specialist assistance for this phase. SEMS will most likely be required to maintain its own hardware through SIMSA.

EXHIBIT III-1

MICRO S/I PRODUCT ENVIRONMENT

- WHO SELLS ?
 - only SEMS.
- WHO DISTRIBUTES ?
 - SEMS should achieve 60% of total units.
 - OEM should achieve 40% of total units.
- WHO INSTALLS ?
 - user only : 5%
 - user + OEM : 15%
 - user + SEMS : 30%
 - SEMS only : 50%
- WHO MAINTAINS ?
 - only SEMS
- WHO SUPPORTS ?
 - distributor only : 75%
 - SEMS assistance on a contract, fee-paying basis 25%
- WHO PROMOTES ?
 - distributors, but under guidance from SEMS and controlled by SEMS.

- The on-going systems support of the Micro S/1 should be done mainly by the distributor. Wherever this support is done by SEMS, either directly or through an SSCI, it should be fee paying.
- The promotion of the Micro S/1, through trade press, brochures, trade fairs and conferences can be done by all distributors, but should be under the guidance of SEMS, since there is a legal obligation, in many European countries, for companies to produce product performance in accordance with that implied by advertising.
- Integration of function by successive technology advances will suck in basic software functions as well as logic, memory, and certain I/O functions. This is a significant development, since the control of the basic software functions will escape the systems vendor who buys his chips OEM.
- Reliability is as much a strong sales argument as a profit generator: users are impressed by reliability and are willing to pay a premium for it. In addition, as already noted, the reputation of reliability so generated will spill over onto follow-on products.
- Improved reliability also means improved profitability of the maintenance function - an important point because of the increasing proportion of total revenue generated by maintenance, and the difficulty of making a profit from this activity due to rising labour costs.
- Support services (i.e. systems and application software assistance) should be centralized around an on-line group of specialists who support end users, SSCI and local SEMS staff remotely on a two-shift basis. This approach has been successfully implemented by software houses in support of their packages and reduces costs effectively.

EXHIBIT III-2

SUGGESTED MICRO S/I PACKAGES

PACKAGE I

- Hardware : CPU + 32K, 180cps printer, 2 floppy disks, 1920 ch. VDU, one synchronous line or direct connect.
- System Software : Monitor, monostation ; data capture formatter.
- Languages : Assembler, COBOL, FORTRAN
- Applications : none
- Options : none
- Installations : one-time charge
- Support : contract
- Price Target : 80KF
- Functions : data capture, workstation, text processing, small business system.
- Markets : all transactional and general business applications, support of larger S/I systems, satellite processing, industrial automation, laboratory/scientific processing.

B. SUGGESTED MICRO S/I PACKAGES

- The summary of the data produced by interviews with the 80 end-users and 28 system/software houses has been condensed into three packages of hardware and software in this section, two of which can be considered to be true Micro S/I models and the third entering into the S-1 range.
- (Obviously, when they were interviewed, neither the end users nor the SSCI were asked to limit their suggestions to a given range of memory sizes, take into account the existence of the S-1 or any other product range limitations of peripherals, memory or price/performance).
- Package I:
 - the minimum hardware configuration, recommended as the core of the S-line, is a 32K bytes, 180 cps printer, 2 floppy disk and one VDU (1920 ch.) module which includes either a direct connect line to other S-line models or a synchronous line remote connection to other hardware; the target end user price, exclusive of any discounts should be 80 KF;
 - the physical layout would appear to be the VDU centrally supported by a disk, a low floppy disk cabinet to the right with two floppy disk drives positioned vertically, (one on top of the other) and the 180 cps printer to the left at right angles to the operator keyboard of the VDU; the synchronous line controller, CPU and 32K (plus space for 96K additions), printer controller, floppy disk controller and VDU controller can all be integrated on one or two boards located within the VDU itself;
 - the system software of package one should be limited to single station operation, but have the standard data captive/formatter package and use "S-line" file storage/manipulation software; languages can be limited to Assembler, FORTRAN, and COBOL;

EXHIBIT III-3

SUGGESTED MICRO S/1 PACKAGES (CONT'D)

PACKAGE II

- Hardware : CPU + 64K, 180 cps printer, 2 floppy disks 1920 ch. VDU, one synchronous line or direct connect.
- System Software : Monitor, multistation; data capture formatter.
- Languages : Assembler, COBOL, FORTRAN, "REAL TIME".
- Applications : none.
- Options :
 - up to 3 VDU, additional;
 - up to 3 synchronous lines, additional
 - card reader
 - tape drive + controller
 - one special device
- Installation : one-time charge
- Support : contract
- Price Target : 110KF
- Functions : as for I
- Markets : as for I.

- upgrades from this basic package to another should be presented as model upgrades, i.e. requiring a software upgrade as well as addition of hardware options; the role of this package is to bring down the price as low as possible while retaining sufficient margin;
- the suggested functions and markets are given in Exhibit III-2 and focus on the large volume, broad application targets of the typical low-end minicomputer; the key point is that the adaptation of the Micro S/1 hardware to a given application should be accomplished either by an SSCI, or by the end user himself or by SEMS assistance on a (profit-making) paying basis - i.e. the hardware should sell itself and support should be considered as a separate business altogether.

• Package II

- there is no difference between this hardware package and package I in terms of function, market or physical layout other than the fact that certain markets requiring a 64K minimum of memory or additional workstations or a real time language etc., cannot be serviced by package I;
- similar to the marketing of IBM's Series/1, it may occur that package I is offered in competitive situations, but that package II is the predominant configuration installed; this would be attractive and should be encouraged where possible;
- the main extensions of package II over package I are the doubling of memory and the optional addition of 3 extra VDUs, card reader, tape drive and a special device (e.g. badge reader); see Exhibit III-3.
- the target price of 110 KF appears to be quite possible for SEMS, taking into account the S-1 peripherals and the memory pricing structure in use; however it is not clear how the target manufacturing cost of 39 KF could be achieved;

EXHIBIT III-4

SUGGESTED MICRO S/I PACKAGES (CONT'D)

PACKAGE III (not necessarily Micro S/I)

- Hardware : CPU + 128K, 180 cps printer, 2 floppy disks 1920 ch. VDU, Disk controller + 2 x 10MB, one synchronous line or direct connect.
- System Software : Monitor, multistation ; database handler; data capture formatter.
- Languages : Assembler, COBOL, FORTRAN, "REAL TIME".
- Applications : optional, tariffed
- Options :
 - up to 7 VDU, additional; monitor multistation
 - up to 7 synchronous lines, additional
 - up to 2 10MB fixed disk drives, additional;
 - 300 lpm printer (additional, not replacement)
 - card reader
 - tape drive + controller
 - two special devices
- Installation : one-time charge
- Support : contract
- Price Target : 220KF
- Functions : as for I
- Markets : as for I.

- it is important that this model should produce a significant profit margin; if, for example, package I were loss-making and package II break-even, then the introduction of the Micro S/1 should be delayed until margins are feasible, because package III is more in line with the S-1 already announced;

- Package III:

- Exhibit III-4 outlines the basic package and options of the high end model of the Micro S/1, which may be feasible with existing hardware; the main differences are the extension of memory to 128 K octects and the addition of 2 fixed 10 MB disks with controller;
- main options include up to 7 VDUs, of synchronous lines and a 300 lpm printer, as well as an extension to 4 x 10 Mb disk drives;

C. MICRO S/1 HARDWARE CATALOGUE

- Exhibit III-5 is an attempt at summarizing the requirements of packages I, II and III, and consolidating them with the existing URC of the S-1 catalogue as it exists today. (INPUT has no knowledge of intended modifications to the existing catalogue, and these must be taken into account).
- The CPU and memory devices will of course be new, but the decision has to be made as to whether they are manufactured by SEMS or bought from an OEM source. This decision should be made on the basis of margins alone, and should include consideration of the future trends of these devices (very rapid price decreases, combined with substantial performance increases - can SEMS follow?).
- The devices with no SEMS equivalent include:

EXHIBIT III-5

MICRO S/I HARDWARE PRODUCT CATALOGUE

- CPU : OEM/own manufacture, new
- Memory : OEM/own manufacture, new
- Floppy Disk : dual DD, (URC 12220/21)
- VDU : 1920 ch., (12004 D is nearest, see below)
- Synchronous line : one synchronous, no equivalent (12004 D is nearest)
- Direct connect : unspecified length, no equivalent in SEMS catalogue
- Fixed disk : 10 MB, 2 drives (URC 12280/2)
extension up to 2 additional drives
- Card reader : 80 col, 300 cpm, (URC 12120)
- Printer : (i) 180 cps, (URC 12401)
(ii) 300 lpm, (URC 12423)
- Magnetic tape : a track, 800/1600 bpi, 2 drives, no equivalent
- Synchronous line : up to 7 additional synchronous, no equivalent extensions

- the "direct connect" to S-line hardware; this was consistently mentioned by end users and SSCI alike but was not specified as to length, performance or role; presumably this would allow packages I & II to act as large workstations of the S-line under direct control of the larger model CPUs,
- magnetic tape, 800/1600 bpi; this switchable unit is not currently available from SEMS, who offer either 800 bpi or 1600 bpi, but not both in one unit,
- single to multiple synchronous line with integrated controller; the direct equivalent does not appear to be available; although SEMS can offer a functional equivalent; system software modifications to existing monitors may be necessary for this, if implemented.

- Again, the key aspect of this catalogue is the margin offered by each line item which should be individually profitable.

D. LIFE CYCLE CONCEPT

- The commercial life of minicomputers of all sizes is continually shortening: whereas the early minis could expect a lifetime of as much as ten years, today's minis are unlikely to remain competitive for more than 5 years. This means that, despite memory price reduction, the addition of new peripherals, system and application software etc., an average mini computer will not be commercially viable beyond 5 years.
- At the low-end of the minicomputer spectrum, this life cycle concept is at its worst. This is because a low-end mini distinguishes itself by its competitive price above all else, and the definition of what is a low-end price is changing on an almost monthly basis.

- Therefore there is a likelihood that the Micro S/l cannot expect more than a 3 year commercial life; this includes the assumption that continual improvements will be brought out by SEMS, to the extent that the Micro S/l design allows, to maintain its competitiveness during that period.
- This has a direct impact on the role the Micro S/l can be expected to play for SEMS: it is unlikely that the Micro S/l will expand the client base by more than 3,000 units.
- It also has an impact on SEMS' decision on whether to build or buy: it is not adequate to enter the low-end minicomputer market merely because current margins allow it, but planned improvements should permit a 25% price decrease over the 3 year life cycle, maintaining margins.
- Essentially this means that SEMS' product plans for each new product introduction must be defined in detail to cover (i) the entire commercial life of each model (ii) the commercial life of the line into which each model is integrated.

**IV. MARKET POTENTIAL, MIX
AND PRICE/COST TARGETS**

IV. MARKET POTENTIAL

- The expected sales volume of the Micro S/1, by country can be deducted from:
 - the total potential market, estimated for this type of product, year by year, country by country,
 - the proportion of the total market served by the Micro S/1,
 - the market impact of SEMS, in number of salesmen, market image etc., country by country,
 - the proportion of sales achievable by SSCI,
 - the estimated reaction of the competition and resulting impact of their products on the Micro S/1.

A. TOTAL POTENTIAL MARKET BY COUNTRY

- For systems in the \$15,000 - \$45,000 range, the total potential market is given for each country market covered by the survey in Exhibit IV-1. The numbers shown represent the number of systems shipped in each year from (i) all suppliers (ii) SEMS with Micro S/1 and the resulting % penetration by SEMS of that marketplace.
- The shipments include minicomputers in the range for all uses:
 - small business systems,
 - industrial automation,
 - workstations,
 - scientific/technical/laboratory,
 - networking.

EXHIBIT IV-1

MICRO S/1 MARKET FORECAST
SHIPMENTS, UNITS,, 1980 - 1982

<u>COUNTRY</u>	<u>SHIPMENTS</u>			
	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>TOTAL</u>
• <u>FRANCE</u>				
- total potential	2200	2900	3800	8900
- Micro S/1	500	800	400	1700
- % penetration	22.7	27.6	10.5	19.1
• <u>WEST GERMANY</u>				
- total potential	2500	3300	4500	10,300
- Micro S/1	200	350	180	730
- % penetration	8.0	10.6	4.0	7.1
• <u>BENELUX</u>				
- total potential	900	1200	1600	3700
- Micro S/1	200	250	120	570
- % penetration	22.2	20.8	7.5	15.4
* <u>TOTAL</u>				
- total potential	5600	7400	9900	22,900
- Micro S/1	900	1400	700	3,000
- % penetration	16.1	18.9	7.1	13.1

- The mix of such systems by country is estimated as follows:

<u>France :</u>	- Industrial Automation	42
	- Scientific/Tech./Lab.	22
	- Networking	15
	- Small Business	15
	- Workstations	6
<u>West Germany :</u>	- Industrial Automation	60
	- Scientific/Tech./Lab.	25
	- Networking	8
	- Small Business	5
	- Workstations	2
<u>Benelux :</u>	- Industrial Automation	51
	- Scientific/Tech./Lab.	25
	- Networking	10
	- Small Business	10
	- Workstations	4

- There is little scope for SEMS to develop small business sales in West Germany and Benelux, because of the strong national suppliers (Nixdorf, Kienzle, Philips). Also most of the national SSCI in those markets have made their choice of minicomputer supplier for turnkey systems, and would be difficult to convince that they should change to SEMS.
- Price alone would be adequate motivation for SEMS to enter office products OEM markets, since the package I configuration is almost exactly the Xerox 800, except that the software needed is specialized, the keyboard needed is specialized and the printer must be capable of upper case, lower case printing, backspace/underline etc.
- None of the above requirements are beyond SEMS, but it does not appear likely that the company will enter such a market: it will take more than this one study to convince SEMS that such a market is open to them.

EXHIBIT IV-2

TARGET PACKAGE PRICE DECLINE 1980 - 1982

	<u>TARGET PRICES IN KF</u>				<u>-% AVE</u>
	<u>1980</u>	<u>1981</u>	<u>1982</u>		
• Package I	80	64	51		22
• Package II	110	90	75		27
• Package III	220	190	165		34

- Over the 1980-82 period, INPUT estimates that the Micro S/1 shipments will total 3,000, or just over 13% of the total market for the small system in the countries analysed. Higher penetration, (and largest number of systems) will go to France with just under 57% of all Micro S/1 shipments in the period.
- This is entirely due to SEMS' strong French market bias and not to opportunity: West Germany over the time period offers a market for just under 45% of total shipments, most of which are small business systems. SEMS does not have the image of a small business system vendor and will not be approached for such systems as much as the Micro S/1 would merit.

B. PRICE TRENDS AND DISCOUNTS

- In section III are examined the target prices for the three packages of hardware/software defined by the SSCI and end-users interviewed. This did not include price trends and discounts, both of which will seriously affect SEMS' margin on the Micro S/1.
- Over the 1980-82 period, the target package prices will decline as shown in Exhibit IV-2.
- The % discount range expected will be constant over the period and will vary from 0% (single unit sales) to 20% (more than 10 units) with an average of 12.5% for the total sales volume.
- However, there are significant differences from one country market to the next in terms of local currency values of a given configuration. For equivalent configurations, the West German market prices are approximately 15% higher than in France (Benelux prices are marginally higher than the French market).

EXHIBIT IV-3

DATA BASE 1980 - 1982

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>Composite</u>
* Mix of sales:				
- France	0.56	0.57	0.57	0.57
- W. Germany	0.22	0.25	0.26	0.24
- BNLX	0.22	0.18	0.17	0.19
* Price mix (France = 1)				
- France	1	1	1	1
- W. Germany	1.15	1.15	1.15	1.15
- BNLX	1.05	1.05	1.05	1.05
* Average discount expected: 12.5%				
* Price targets:				
- Package I	80	64	51	
- Package II	110	90	75	
- Package III	220	190	165	
* Manufacturing cost targets, at 35% of net sales price, KF:				
- Package I	25.7	20.6	16.4	
- Package II	35.4	28.9	24.1	
- Package III	70.7	61.1	53.1	

- This underlines the viability of using SSCI for system sales and support in West Germany, since:
 - SEMS' own sales coverage is weak there,
 - the added market value per configuration allows discounts up to 15% without loss of margin.

C. MANUFACTURING COST TARGETS

- The mix of country sales, average discounts and country market prices provide the basis for structuring the manufacturing cost targets for each of the packages, for each of the years over the 1980-82 period.
- Exhibit IV-3 is based on the data provided so far.

**V. END USER, SYSTEM/SOFTWARE HOUSE
INTERVIEW ANALYSIS**

V. END USER, SYSTEM/SOFTWARE HOUSE INTERVIEW ANALYSIS

- Since both the end user and the SSCI markets are to be catered for with the Micro S/1, and many of the questions asked were identical, the analysis from both samples have been included together in this section. The variance of opinions can thus be more easily examined.

A. SAMPLE USAGE OF MAIN SYSTEM EQUIPMENT

- In order to establish the reliability of the sample, and to examine the influence of choice of main system on the choice of minicomputer, end users were asked to provide the name of the vendor of the main system equipment in use.
- The sample shown in Exhibit V-1 clearly underlines the validity of the sample: it is, with few exceptions, an image of the country markets examined.
- It is significant in that all of the top three vendors in the ranking now supply minicomputers. They have an advantage over SEMS in sheer market presence and reference sales, but above all in the new development where users are beginning to be concerned over the compatibility of their minicomputer hardware with their mainframe systems.
- So far this factor has not emerged as a determining factor of choice for users, because IBM, Honeywell and Siemens minicomputers are as incompatible with their mainframe products as anyone else's minicomputers. This may become important in the near future, however.
- The end-user allocation of EDP expenditure is given in Exhibit V-2

EXHIBIT V-1

WHAT EDP EQUIPMENT DO YOU PRESENTLY USE?
PERCENT RESPONSE

RANK	MANUFACTURER	FRANCE	W. GERMANY	B/N/L	AVERAGE
1	IBM	56	56	47	54
2	C11 - HB	22	6	6	13
3	SIEMENS	2	16	6	8
4	UNIVAC	5	9	6	7
5	ICL	2	0	12	3
6	DEC	2	0	6	2
7	OTHERS	10	13	18	12

EXHIBIT V-2

ALLOCATION OF EDP EXPENDITURE
END USERS, % BY CATEGORY

<u>BUDGET ITEM</u>	<u>France</u>	<u>W. Germany</u>	<u>Benelux</u>	<u>Average</u>
• Hardware	39.5	32.0	38.5	37.5
• Software	20.0	<u>21.0</u>	<u>8.5</u>	<u>19.0</u>
- system	*	(6.8)	*	
- application	*	(4.5)	*	
- network	*	(9.7)	*	
• Operations	24.0	34.5	46.0	29.0
• Other	16.5	12.5	7.0	14.5

Notes:

- * = no data provided
- French data is weak, as was response from Benelux.

B. END USER USAGE OF MINIS

- The end-user sample usage of minicomputers was just as valid as the main system usage (see Exhibit V-3).
- DEC outperforms all other suppliers in the three markets examined. This is not so much a function of the DEC product, performance and flexibility as of DEC's aggressive marketing policies.
- DEC promotes its products through OEM operations more successfully than any other vendor and hence is able to explore a considerably wider range of marketing opportunities across all economic sectors. The penetration of the DEC product line throughout all three markets is greater than for other vendors who are concentrating on fewer vertical markets.
- IBM's small but regular performance in all three markets enables it to obtain second place over SEMS and H-P, due to the lack of performance of both in Benelux.
- Hewlett Packard, like DEC, shows up well against the home manufacturers in Germany. Siemens has very little presence in minis anywhere else apart from Germany.
- Only DEC, Wang, Philips, General Automation and IBM recorded user responses in all markets.
- The Benelux market apparently has more mini vendors than any other and this is a reflection of the keenly competitive EDP environment fostered by the international commercial activity in both Holland and Belgium.
- The showing of Philips in the Benelux market is interesting as it can be termed the home supplier. Whereas SEMS and SIEMENS both show fairly well in their home markets, Philips can apparently only record the same user response as it can in France - 7%. User conception of a mini computer may be responsible for producing this uncharacteristic result.

EXHIBIT V-3

END USER USAGE OF MINIS, PERCENT ACCORDING TO MANUFACTURER

RANK BY TOTAL	MANUFACTURER	FRANCE	GERMANY	BENELUX	AVERAGE
1	DEC	16	22	14	19
3=	SEMS	13	5	0	7
3=	HEWLETT PACKARD	9	8	0	7
2	IBM	9	8	7	8
5=	C11/HB	11	2	0	5
5=	PHILIPS	7	3	7	5
8	WANG	5	2	7	4
9=	DATA GENERAL	5	2	0	3
9=	SIEMENS	0	6	0	3
5=	NIXDORF	0	11	0	5
13=	INTERTECHNIQUE	4	0	0	1
11=	TEXAS	0	3	0	2
13=	DATAPORT	2	0	7	1
11=	GENERAL AUTOMATION	2	2	7	2
	OTHERS	17	28	53	26

C. MOST FREQUENT APPLICATIONS

- In examining applications both end-users and SSCI were polled, (see Exhibit V-4 and V-5). The difference between the two are understandable: there is a high proportion of SSCI whose main interests are in implementing commercial/business applications as opposed to industrial automation/process control.
- Thus overall user response is mainly in favour of process control, with administration/personnel applications coming second, whereas the SSCI are mainly in favour of management/admin./commercial applications.
- In the countries examined, data entry/capture functions are also important for minicomputers.
- The West German market can be characterised by a strong process control demand from end users supplemented by a high percentage of scientific/technical/laboratory applications. This appears to be linked to the conception the German users have of what a minicomputer is for, as opposed to what it can be made to do. The German SSCI do substantial business in communications also.
- In the Benelux the emphasis is on administration/personnel and data entry/-capture for end users and SSCI alike.

D. MAIN ROLE MINICOMPUTER PLAYS

- Exhibit V-6 summarizes for all of the countries interviewed on the main role of the minicomputers they use.
- In France, the use of minicomputers for networking is at twice the level of that found in the other two countries. In West Germany and Benelux, the dominant factor is the improved quality of the data provided.

EXHIBIT V-4

SMALL/MINICOMPUTER APPLICATIONS IN USE
PERCENT RESPONSE

APPLICATION	FRANCE	W. GERMANY	BENELUX	AVERAGE	RANK
PROCESS CONTROL	16	39	19	25	1
ADMIN./PERSONNEL	28	—	24	17	2
DATA ENTRY/CAPT.	7	10	24	11	4
NETWORK NODE/CONN.	10	—	—	5	5=
SCIENTIFIC/TECH/LAB.	1	31	5	13	3
CONTROLLER FUNCTIONS	4	2	—	3	8=
STOCK CONTROL	4	2	5	4	7
PAYROLL	4	—	5	3	8=
BANKING/FINANCIAL	4	6	5	5	5=
FILE INQUIRY	1	—	5	1	11
POINT OF SALE	—	2	10	2	10
RESPONSE NO.	67	51	21	139	

EXHIBIT V-5

MOST FREQUENT APPLICATIONS AREAS
SYSTEMS/SOFTWARE HOUSES

FRANCE	
• MANAGEMENT/ADMIN. COMMERCIAL/PERSONNEL	— 50% COMPANIES
• TRANSPORT APPLICATIONS	— 42%
• ACCOUNTING/PAYROLL/FINANCIAL	— 62%
• TELECOMMUNICATIONS/NETWORKING	— 42%
• PROCESS CONTROL	— 30%
GERMANY	
• COMMERCIAL APPLIC. (INVOICING ETC.)	— 42 % COMPANIES
• INDUSTRIAL MONITORING/ SURVEILLANCE/SECURITY	— 17%
• PRODUCTION PLANNING & CONTROL	— 33%
• DATA CAPTURE/ADMINISTRATION	— 17%
• TRANSPORT	— 8 %
• COMMUNICATIONS	— 67 %
BENELUX	
• ACCOUNTING/PAYROLL	— 90%
• MANAGEMENT/ADMIN.	— 90%
• NETWORKING	— 33%
• PROCESS CONTROL/ STOCK CONTROL	— 33%
• ORDER/INVOICING	— 17%

EXHIBIT V-6

MAIN ROLE MINICOMPUTER PLAYS IN COMPANY
PERCENT RESPONSE

ROLE	COUNTRY			WEIGHTED AVERAGE
	FRANCE	W. GERMANY	BENELUX	
*REDUCTION OF ADMIN. COSTS	5	21	6	13
*SPEED UP AVAIL/ DISTRIBUTION OF DATA	12	23	26	21
*IMPROVE QUALITY OF DATA AVAILABLE:	<u>10</u>	<u>32</u>	<u>45</u>	<u>27</u>
– FINANCIAL	2	–	19	5
– COMMERCIAL	2	5	10	5
– PRODUCTION	4	23	3	12
– MGT/ADMIN.	2	4	13	5
*NETWORKING	37	16	16	17
*OTHERS:				
– LOCAL PROCESS	20	–	3	10
– DECENTRALIZE	12	4	3	11

- Second in line for everyone is the speed of availability of the data and its distribution among the users of the information. Only in West Germany is the reduction of administration costs a factor.

E. INDEPENDENCE OF EQUIPMENT SUPPLIER FOR SOFTWARE

- An important consideration for the support of a new minicomputer is the degree to which the manufacturer must support the product himself for basic (system) software, applications software and the support of network systems.
- The three categories of support were classified as "own" (i.e. from the user himself, third party (i.e. SSCI) and from the manufacturer. Exhibit V-7 summarizes the end user data, and Exhibit V-8 the data from the SSCI.
- The percentages vary slightly but the profile of support does not:
 - manufacturers supply approximately 70% of the system (basic software) and end users supply the remainder, with SSCI intervening rarely,
 - large end users supply three quarters of their own application software, while the manufacturers supply the majority of the remainder,
 - third party SSCI supply 10% of the applications software and 18% of the network software.
- Manufacturers' responsibility in software can therefore be summarized as 70% of basic software, half that amount in communications - based systems and one quarter that amount in application software. This emphasizes why INPUT does not believe that applications software, other than for specific vertical markets, is required for the support of the launch of the Micro S/l.

EXHIBIT V-7

HOW INDEPENDENT ARE YOU OF THE EQUIPMENT
MANUFACTURER FOR SOFTWARE?

COUNTRY	ITEM	SUPPLIER/SOURCE		
		MFR	OWN	THIRD PARTY
FRANCE	BASIC SOFTWARE	70	28	2
	APPLICATIONS	9	86	5
	NETWORK	26	62	12
W.GER.	BASIC SOFTWARE	70	21	9
	APPLICATIONS	15	71	14
	NETWORK	36	40	24
B/N/L	BASIC SOFTWARE	81	13	6
	APPLICATIONS	47	47	6
	NETWORK	25	50	25
TOTAL	BASIC SOFTWARE	71	23	6
	APPLICATIONS	16	74	9
	NETWORK	31	51	18

EXHIBIT V-8

INDEPENDENCE OF MANUFACTURER FOR THE
PROVISION OF SOFTWARE, SYSTEMS/SOFTWARE HOUSES

TYPE	SOURCE	FRANCE	W. GERMANY	BENELUX	AVERAGE
BASIC	MANUFACTURER	74	90	55	78
	OWN	26	10	45	22
	THIRD PARTY	—	—	—	—
APP	MANUFACTURE	5	—	40	2
	OWN	94	99	60	87
	THIRD PARTY	1	—	—	11
NETWORK	MANUFACTURER	—	22	—	12
	OWN	100	72	100	85
	THIRD PARTY	—	6	—	3

F. NEED FOR MINICOMPUTERS

- The end user requirements for increasing/decreasing/no need for minis is examined in Exhibit V-9. The percentage of users already making use of minis in the various roles indicated is also shown, but in brackets.

1. PROCESS CONTROL USE

- The need for using minis in Process Control applications has already been noted as high in West Germany. It is interesting therefore to see that no significant diminution of this need is foreseen by users. Indeed, 78% of respondents expect an increasing requirement.
- Importantly, whilst only 19% of German respondents reported "No Need" in process control, the results from the other markets were very much higher with 57% of Benelux users and 55% of French users seeing "No Need" for minis in process control.
- The process control market in Benelux is growing far more slowly than in France or Germany with only 29% of respondents actually using equipment in this role and the same number foreseeing an increasing need.

2. NETWORK NODE USE

- For network node usage, the West German market is the most developed, with 47% of respondents already using minis for this and 67% expecting to see their needs increasing.
- Although only 17% of Benelux respondents use of minis network nodes, the market is clearly expanding, as reflected by the 67% of respondents who reported an increasing requirement in this area.

EXHIBIT V-9

DO YOU HAVE A NEED FOR MINICOMPUTERS?

ROLE	NEED	COUNTRY			TOTAL
		FRANCE	WEST GERMANY	B/N/L	
PROC CONT	(IN USE)	(42)%	81%	(29)%	47%
	INCREASING NEED	45	78	29	47
	DECREASING NEED	0	3	0	1
	NO NEED	55	19	57	39
NET NODE	(IN USE)	(30)	47	(17)	59
	INCREASING NEED	40	59	67	87
	NO NEED	60	31	33	76
TERM CONT	(IN USE)	(27)	56	(0)	39
	INCREASING NEED	40	72	60	57
	DECREASING NEED	0	3	0	1
	NO NEED	60	25	40	42
SBS	(IN USE)	(39)	61	(17)	47
	INCREASING NEED	55	68	33	59
	DECREASING NEED	3	3	0	3
	NO NEED	42	29	50	37
WORKSTATION	(IN USE)	(23)	60	(43)	(40)
	INCREASING NEED	57	63	43	56
	DECREASING NEED	3	7	0	4
	NO NEED	40	27	29	31

- Network usage growth in West Germany is proceeding at a slightly slower rate as in Benelux (67% of respondents) but from a higher base. French respondents however reported a high incidence of "No Need" (60%) which is in line with the comparatively low number (40%) of French respondents who stated that need was increasing.

3. TERMINAL CONTROLLER USE

- It can be concluded that the use of minis as Terminal Controllers in Benelux is on the edge of a breakthrough with 60% of respondents reporting an increasing need to employ minis in this role. This is highly significant when it is considered that no respondents reported either "existing use" or "decreasing need".
- A high incidence of existing usage is apparent in West Germany with an important growth indicator showing up in the fact that 72% of respondents report "increasing need".

4. SBS USE

- The use of minis as small business systems in France is attested to by 39% of respondents. Growth is also expected in this area and 55% of French respondents report increasing need. West Germany, however, presents the best opportunity here with an existing very high usage and a similarly high expected demand. However, as already noted, the competition for this market is fierce, in the shape of Kienzle, and Nixdorf and IBM, all firmly entrenched in the market.
- A particularly high percentage of Benelux users (50%) reported "no need" for the use of minis as SBS equipment and only 33% stated that they saw an increasing need. Together with the low (17%) number of organisations already using minis in this role it can be concluded that there is no growing demand in this market for using minis in an SBS role.

5. WORKSTATION USE

- Only 23% of French respondents reported use of mini computers in a workstation role. However, a fairly high incidence of increasing demand is reflected by the 57% of French respondents claiming an "increasing need". Although somewhat late in generating a usage of minis in a workstation role, reasonable growth potential can be forecast in France. It is significant, for example, that only 3% of users reported a decrease in their need for minis to act as a workstation.
- Workstation minis are used to a greater extent in West Germany and Benelux with 60% of the West German and 43% of the Benelux respondents using equipment in this role.

G. CONFIGURATION REQUIREMENTS

- These have already been summarized in Section III and the detail is provided in appendix for reference purposes.
- However the summary, item by item, shows:
 - Memory and incremental memory

A notable area of agreement exists across all markets. The principal requirement is that equipment should be available with 32K, 64K and 128K of memory. Respondents are not so definite about incremental requirements although attention of systems houses in France is focussed on 16K and 256K. German users also indicate 256K as a mandatory requirement, although this can be handled by higher members of the S-line.

- Printers

All users in the three markets point to 180 cps printers as important components, whilst in France both systems houses and users point to 120 cps printers as mandatory also. Obviously the provision of 180 cps covers the 120 cps requirement.

- Floppy Discs

No firm conclusions are available on size of floppy discs but users in all markets state that two floppies are a mandatory requirement.

- Tape drive

French users and systems houses agree on the need for 1600 bpi tape and German systems houses concur with this. It would appear adviseable to offer an 800/1600 bpi option, as is currently available with most competitive systems.

- Card Reader

No mandatory responses are recorded for 96 column card readers but standard 80 column card readers receive attention from both users and systems houses in Germany who are agreed in according this feature high priority. This is an obvious option.

- Badge Reader

Users in France and Benelux see this feature as important whilst systems houses in Germany respond similarly. The requirement is not strong enough for a mandatory option, however.

- Optical Reader

Users and system houses in France agree on the high importance of this feature, but again this is not a mandatory option.

- VDU Size and Quantity

One of the principal areas of agreement in the survey, being attested to by both users and systems houses in France and West Germany, and by users in Benelux, is that a 1920 character display is essential. Respondents are more divided over quantity but some evidence exists that a minimum of 3 units is important. West German users are more clear on the quantity matter stating a preference for 5-10 units.

- Communications

Although a high level of opinion indicates the option for 3270 compatibility only French users see this as a high enough requirement for it to be included as mandatory. Not unnaturally, French users and systems houses also see Transpac compatibility as vital. Synchronous transmission is an almost universal requirement. Only in Western Germany which has the highest number of Telex installations in Western Europe, is the compatibility with Telex seen as important. Benelux respondents, both users and systems houses, see 3780 and 3270 compatibility as an important requirement.

- Link to Mainframe

Both users and systems houses in France see a direct or a modem link as vital. Users in all three markets agree on this point.

H. ENVIRONMENT

- The normal environment into which the small system will be installed is that of the office, i.e. dry and dusty. Infrequently this will be airconditioned (see Exhibit V-10).

I. CHARACTERISTICS OR OPERATING SYSTEM

- Overwhelmingly a multiprogramming operating system is felt to be necessary, from both the end-user and the SSCI (see Exhibit V-11).
- This is in agreement with the number of currently executed applications demanded by end users (see Exhibit V-12) which is between 2 and 4.
- The system/software houses were more specific. They defined the actual applications, (or program activities) they wish to see available in simultaneous execution. These included the following:

- W. Germany

- "on-line data capture and batch processing separate program" (several)
 - "program development and batch processing of existing programs"
 - "data capture plus one batch"

- France

- "three partitions: data capture, batch, monitoring control" (several)
 - "up to ten terminals, interactively, for updating and inquiry"

- Benelux

- "three to four levels of interactive data capture, processing and transmission".

EXHIBIT V-10

IN WHAT ENVIRONMENT DO YOU INSTALL MINICOMPUTERS?
SYSTEMS/SOFTWARE HOUSES, % RESPONSE

A. END USERS

	<u>France</u>	<u>W. Germany</u>	<u>Benelux</u>	<u>Average</u>
• Dry	7%	11%	11%	9%
• Wet	7	7	-	6
• Dusty	16	22	22	20
• Office	64	39	55	52
• Other				
- Airconditioned	4	20	11	13
- Unspecified	2	2	1	-

B. SYSTEMS/SOFTWARE HOUSES

	<u>France</u>	<u>W. Germany</u>	<u>Benelux</u>	<u>Average</u>
• Dry	-	8	-	4
• Wet	-	-	-	-
• Dusty	-	-	-	-
• Office	50	83	75	68
• Other	50	8	25	29

EXHIBIT V-11

WHAT SORT OF OPERATING SYSTEM IS REQUIRED?

SYSTEMS/SOFTWARE HOUSES, % RESPONSE

A. END USERS, PERCENT RESPONSE

<u>Characteristic</u>	<u>France</u>	<u>W. Germany</u>	<u>Benelux</u>	<u>Average</u>
• Monoprogramming	16%	11%	14%	14%
• Dual Programming	-	9	-	4
• Multiprogramming	58	74	71	67
• Undecided	26	6	15	8

B. SYSTEMS/SOFTWARE HOUSES

	<u>France</u>	<u>W. Germany</u>	<u>Benelux</u>	<u>Average</u>
• Monoprogramming	10	8	-	4
• Dual Programming	-	-	-	-
• Multiprogramming	90	92	100	96

EXHIBIT V-12

CONCURRENTLY EXECUTED APPLICATIONS
END USERS, PERCENT RESPONSE

NO. OF APPLICATIONS	FRANCE	W. GERMANY	BENELUX	AVERAGE
1	29%	3%	20%	15%
MORE THAN 1, UNDEFINED	17	29%	60	25
2-3	21	58	—	39
4-5	24	10	20	15
≥6	9	—	—	3

J. PREFERENCES FOR LANGUAGES

- COBOL is preferred and ranks first on both the user and systems/software house responses. The preference is more pronounced amongst users and it is notable that 80% of Benelux respondents announced their COBOL preference.
- COBOL preference amongst systems/software houses is less pronounced, particularly in France where demand is lower than Germany and much lower than in Benelux where 40% stated their preference.
- BASIC was accorded third place by both systems houses and users and scored remarkably similar percentage responses in all markets.
- REAL TIME language requirements are strong (second priority) amongst systems houses but appeared not so important to users.
- The results of these questions are summarised in exhibits V-13 and V.14.

K. FILE MANAGEMENT REQUIREMENTS

- Exhibit V-15 shows the preferences, by country, for the file management method needed by end users. This is a difficult question to answer for users, since they cannot easily summarize their total requirements from all applications in one response.
- In West Germany most users felt they would need to seriously consider this aspect before answering and preferred a "no comment" answer. Among those who did answer, most require random file processing and a further 12% require a mix of sequential and/or random and/or indexed sequential.
- In France the same combination of file processing is required by 46% of end users. In France and Benelux indexed sequential is popular.

EXHIBIT V-13

WHAT LANGUAGE(S) WOULD YOU PREFER?
PERCENT RESPONSE, END USERS

RANK	LANGUAGE	FRANCE	WEST GERMANY	B/N/L	AVERAGE
1	COBOL	47%	16%	80%	30%
2	FORTRAN	11	26	0	17
3	BASIC	9	14	10	11
4	PL/1	7	12	0	9
5	ASSEMBLER	2	18	0	9
6	REAL TIME	5	5	0	5
7 =	ALGOL	0	4	0	2
7 =	APL	2	2	0	2
NO PREFERENCE/ OTHER		17	4	10	10

EXHIBIT V-14

WHAT LANGUAGE(S) WOULD YOU PREFER?
PERCENT RESPONSE, SYSTEMS/SOFTWARE HOUSE

RANK	LANGUAGE	FRANCE	W. GERMANY	BENELUX	AVERAGE
1	COBOL	24	26	40	27
2	REAL TIME	13	9	40	16
3	BASIC	14	22	—	16
4	FORTRAN	9	22	—	14
5=	PL/1	9	9	—	8
5=	ASSEMBLER	9	9	—	8
5=	RPG	14	—	—	6
8	OTHER	—	8	20	4

EXHIBIT V-15

FILE MANAGEMENT REQUIREMENTS
END USERS, PERCENT RESPONSE

METHOD	FRANCE	W. GERMANY	BENELUX	AVERAGE
INDEXED SEQUENTIAL	20%	8%	22%	15%
RANDOM	9	31%	-	17
IND. SEQ. & RANDOM	17	3	11	12
SEQUENTIAL, IND. SEQ. & RANDOM	14	6	33	12
SEQUENTIAL & RANDOM	6	3	-	4
OTHER/NO PREFERENCE	34	48	34	41

- Exhibit V-16 shows the end-user requirements for a database system: the majority of users would appreciate the availability of such a system which eliminates the need for most file processing, relying on a standard package.
- Exhibit V-17 shows the preference of the SSCI for the file management methods and database.

L. FILE BACK UP SAVING

- Disc saving proved the most popular with both systems software houses and users with an average of 75% of systems software houses, and 41% of users preferring this method. The preference was particularly noticeable amongst French software systems houses with 82% preferring disc saving to all other methods.
- Both Benelux and French end users however preferred tape saving. The average was adversely impacted by German users, who recorded only 10% in favour of tape against 57% for disc and 29% for floppy disc.
- Overall, the popularity of file saving onto floppy disc was supported by 33% of systems houses in both Benelux and West Germany, who combined to produce the overall second place ranking of this method.
- The results are consolidated in Exhibits V-18 and V-19.

M. PRICE LEVEL USERS ARE WILLING TO PAY

- Exhibits V-20 to V-23 show the profile of user price sensitivity for small/minicomputers. These prices should not be taken at face value. Earlier studies have shown that users accept to pay as much as 50% more than the "ideal" price level for the product they want. Therefore each price level can be multiplied by 1.5.

EXHIBIT V-16

IS A DATABASE SYSTEM NECESSARY?
END USERS, PERCENT RESPONSE

RESPONSE	FRANCE	W. GERMANY	BENELUX	AVERAGE
REQUIRED	57%	47%	67%	54%
NOT REQUIRED	31	53	22	40
UNDECIDED	12	-	11	6

EXHIBIT V-17

WHICH FILE MANAGEMENT METHOD WOULD
YOU PREFER? SYSTEMS/SOFTWARE HOUSES PERCENT RESPONSE

	FRANCE	WEST GERMANY	BENELUX	WEIGHTED AVERAGE
• RANDOM	—	17	—	4
• SEQUENTIAL AND RANDOM	30	8	—	16
• INDEX AND SEQUENTIAL	60	33	—	32
• INDUSTRY SEQUENTIAL AND RANDOM	—	8	100	16
• UNDECIDED	10	—	—	4
• SEQUENTIAL RANDOM AND INDEX SEQUENTIAL	—	33	—	8
• IS A DBMS REQUIRED?	80	83	—	33
• PREFERENCE	TOTAL, TPMS II IDS II	IDMS, RELATIONAL SYSTEM	"FILE SEARCH TECHNIQUE"	

EXHIBIT V-18

ON WHAT MEDIA DO YOU PREFER FILE BACK-UP/SAVING TO OCCUR?
PERCENT RESPONSE, END USERS

MEDIA	FRANCE	COUNTRY W. GERMANY	BENELUX	AVERAGE
DISK	30%	54%	25%	43%
FLOPPY	27	20	25	23
TAPE	36	22	37	29
OTHER	7	4	13	6

EXHIBIT V-19

SHOULD BACK UP BE AUTOMATIC?
SYSTEMS/SOFTWARE HOUSES

	FRANCE	W. GERMANY	BENELUX	TOTAL
YES	87.5%	83.3%	66.6%	82.6%
NO	12.5%	16.6%	33.3%	17.39%

ON WHAT MEDIA DO YOU PREFER FILE BACK-UP SAVING TO OCCUR?
PERCENT RESPONSE, SYSTEMS/SOFTWARE HOUSES

MEDIA	FRANCE	W. GERMANY	BENELUX	TOTAL
DISK	82	50	67	64
FLOPPY	-	36	33	21
TAPE	18	16	-	14
OTHER	-	-	-	-

EXHIBIT V-20

PRIVE LEVEL END USERS ARE
WILLING TO PAY FOR SMALL MINI COMPUTERS

EUROPE

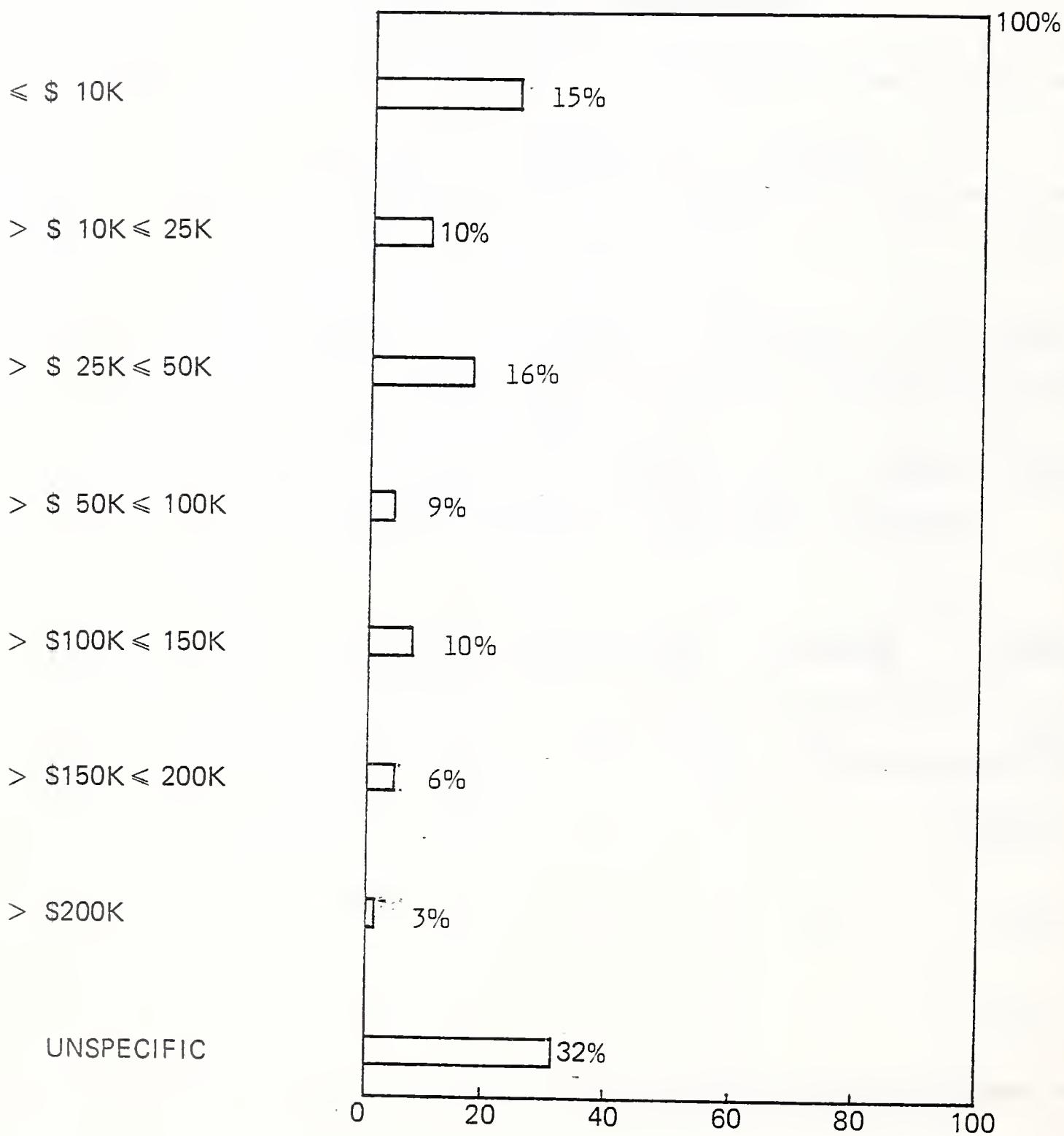


EXHIBIT V-21

PRICE LEVEL END USERS ARE
WILLING TO PAY FOR SMALL MINI COMPUTERS

WEST GERMANY

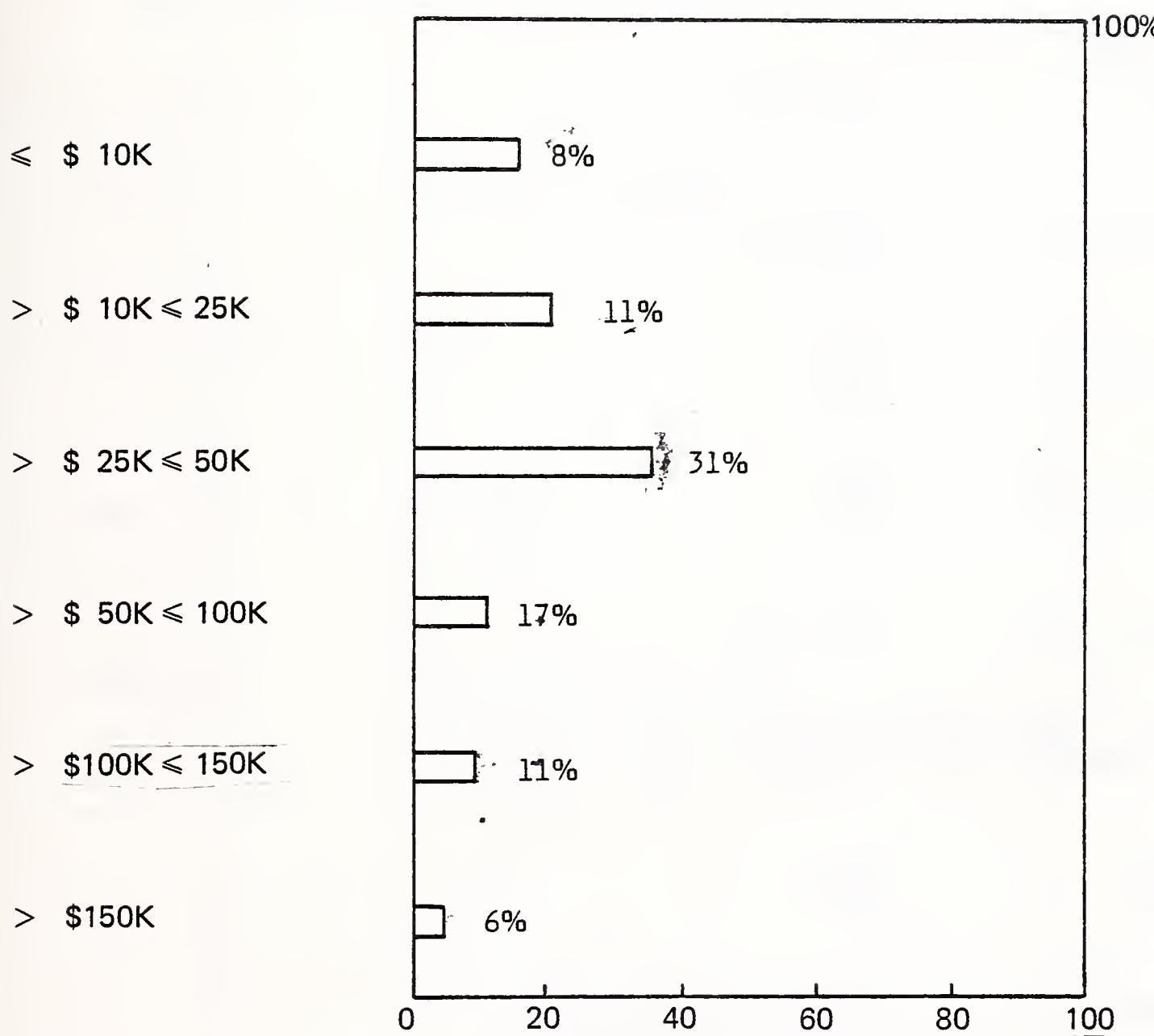


EXHIBIT V-22

PRICE LEVEL END USERS ARE
WILLING TO PAY FOR SMALL MINI COMPUTERS

FRANCE

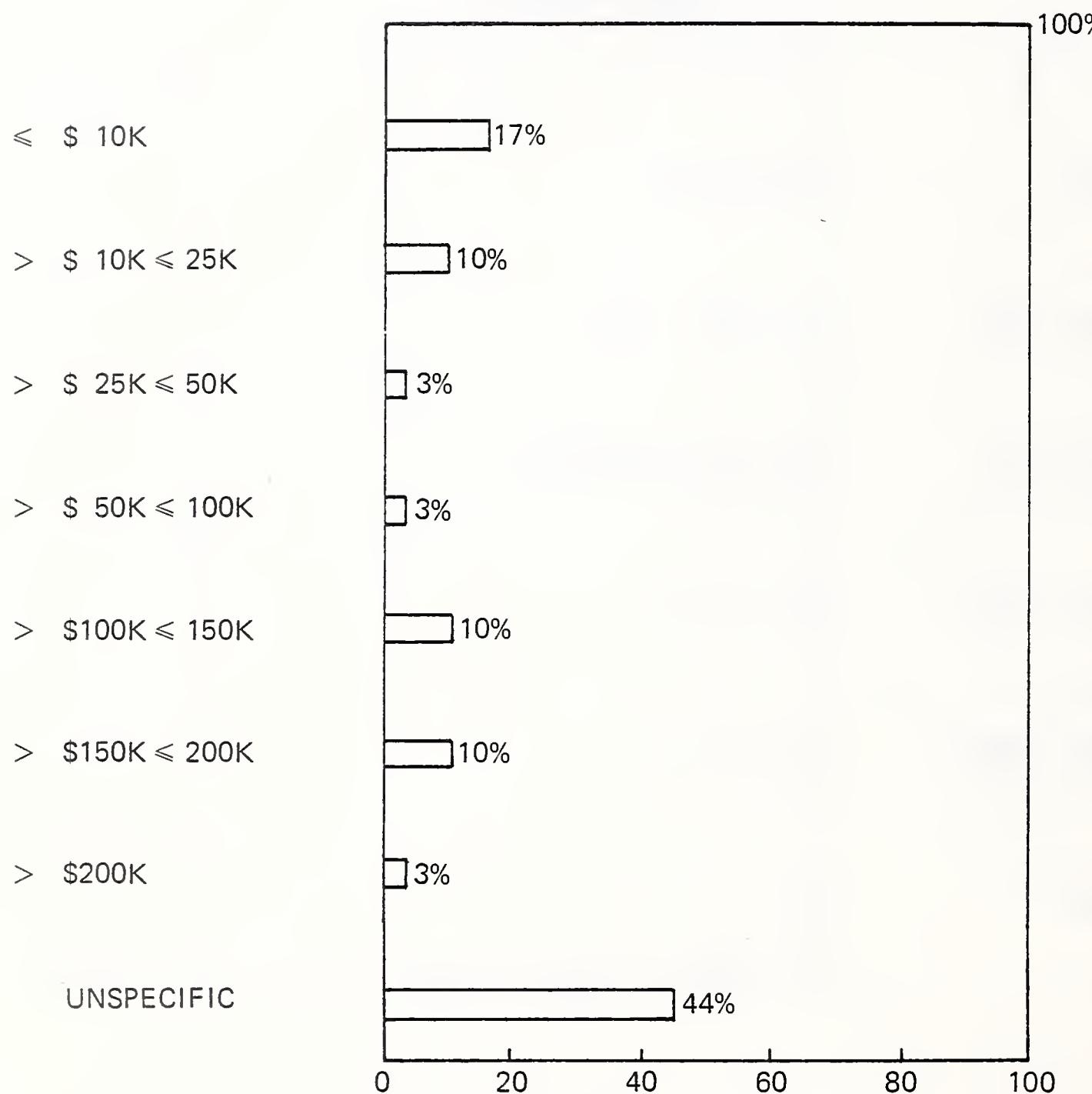
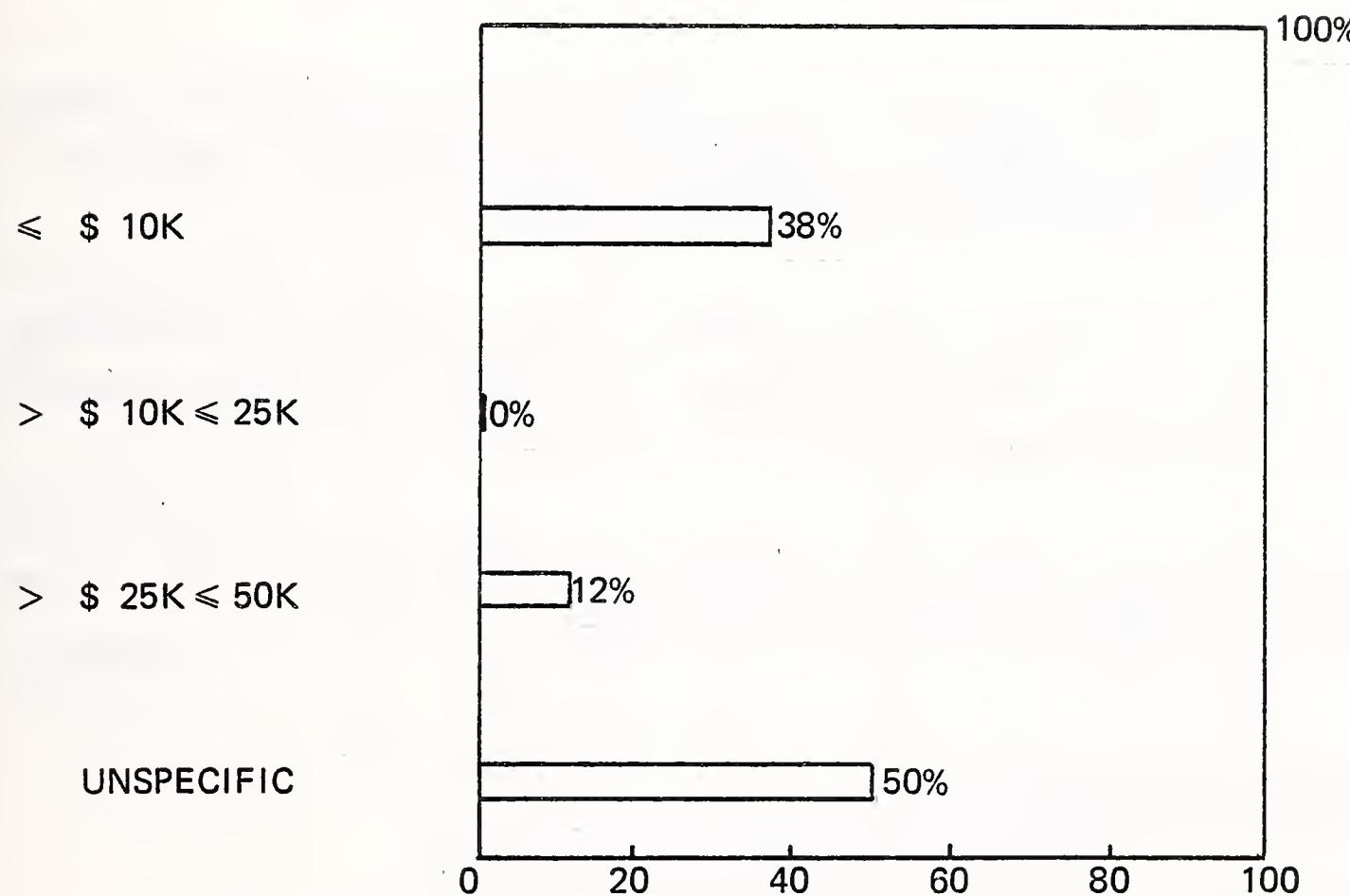


EXHIBIT V-23

PRICE LEVEL END USERS ARE
WILLING TO PAY FOR SMALL MINI COMPUTERS

BENELUX



- There appear to be two levels of price sensitivity for small/mini systems in each country except West Germany:
 - in West Germany the peak sensitivity is in the \$25K to \$50K area, with few users expecting small systems to cost less than this,
 - in France a high proportion of users expect the impossible: systems worth less than \$10K; a second peak around the \$100 - 200K zone is obviously not related to the low-end market,
 - in the Benelux group of countries many respondents preferred to be non-committal (50%), while many others asked for a very small system at less than \$10K.
- The importance of volume to end users is examined in Exhibit V-24. Volume discounts for SSCI are shown in Exhibit V-25.

N. TARIFF PREFERENCES

- End user preferences, for the inclusion or exclusion of specific items, re-examined in Exhibits V-26 to V-29.
- The results demonstrate the rising proportion of users who are demanding that all the items that they pay for be separately tariffed, rather than included in a single payment. Until recently, most of the items listed in Exhibit V-26 were included in a single contract. Exceptions include the maintenance service for purchased equipment and some application software.
- This development has been driven by manufacturers who have begun unbundling their software, (both system and applications) and frequently separately changing installation support and conversion efforts.

EXHIBIT V-24

IMPORTANCE OF PRICING AND VOLUME DISCOUNTS
PERCENT RESPONSE, END USERS

FACTOR	FRANCE	W. GERMANY	BENELUX	AVERAGE
DISCOUNT NOT IMPORTANT IF PROBLEM SOLVED	29%	78 %	25%	51%
DISCOUNT SOME- TIMES REQUIRED	29	17	25	23
DISCOUNT NECESSARY	42	5	50	26

QUANTITY/DISCOUNT RELATIONSHIP
END USERS

FACTOR	FRANCE	W. GERMANY	BENELUX	AVERAGE
MINIMUM QUANTITY MACHINES	6	2	8	5.3
MINIMUM % DISCOUNT	12.5%	20%	25%	19%
NUMBER OF RESPONDENTS	36	36	8	65

EXHIBIT V-25

WHAT VOLUME DISCOUNTS DO YOU EXPECT
FOR LOW-END MINI COMPUTERS?
PERCENT RESPONSE, SYSTEMS/SOFTWARE HOUSE

COUNTRY	NO DISCOUNT DON'T KNOW	NO VOLUME 20-30%	20% 2 MACH.	20-24%		25-29%		30% +	
				≤10	>10	≤10	>10	≤10	>10
FRANCE	33%	33%	—	8%	8%	8%	—	—	8%
BENELUX	75	—	—	—	—	—	—	—	25
W. GERMANY	33	—	8	8	8	17	—	17	8
AVERAGE	39	14	4	7	11	4	—	7	11

EXHIBIT V-26
RESPONDENTS PREFERENCE FOR INCLUSIVE OR
SEPARATE TARIFF BY ITEM

EUROPE

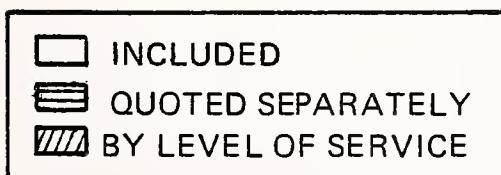
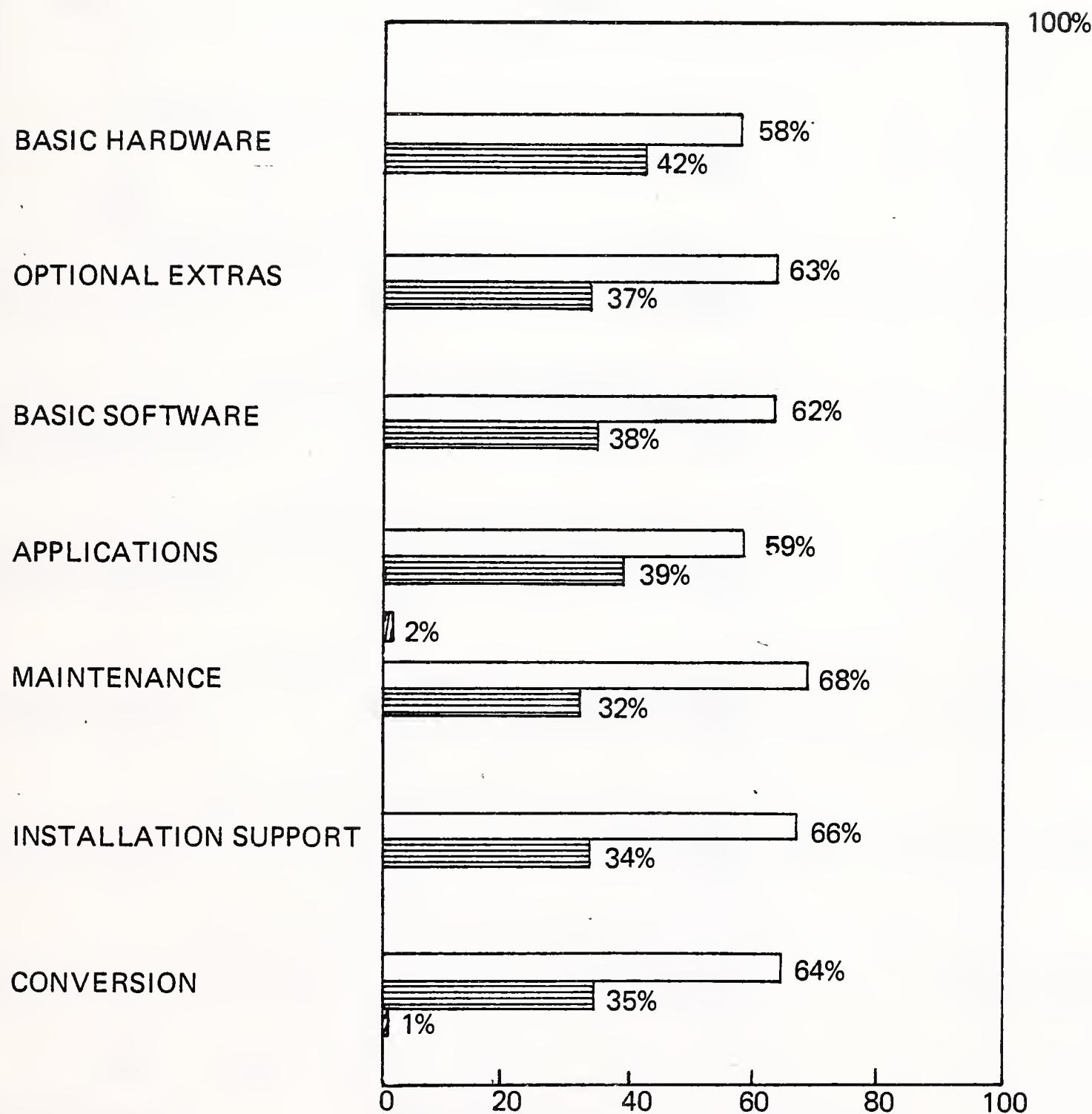


EXHIBIT V-27

RESPONDENTS PREFERENCE FOR INCLUSIVE OR
SEPARATE TARIFF BY ITEM

BENELUX

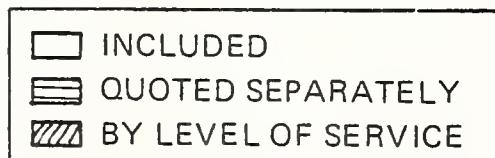
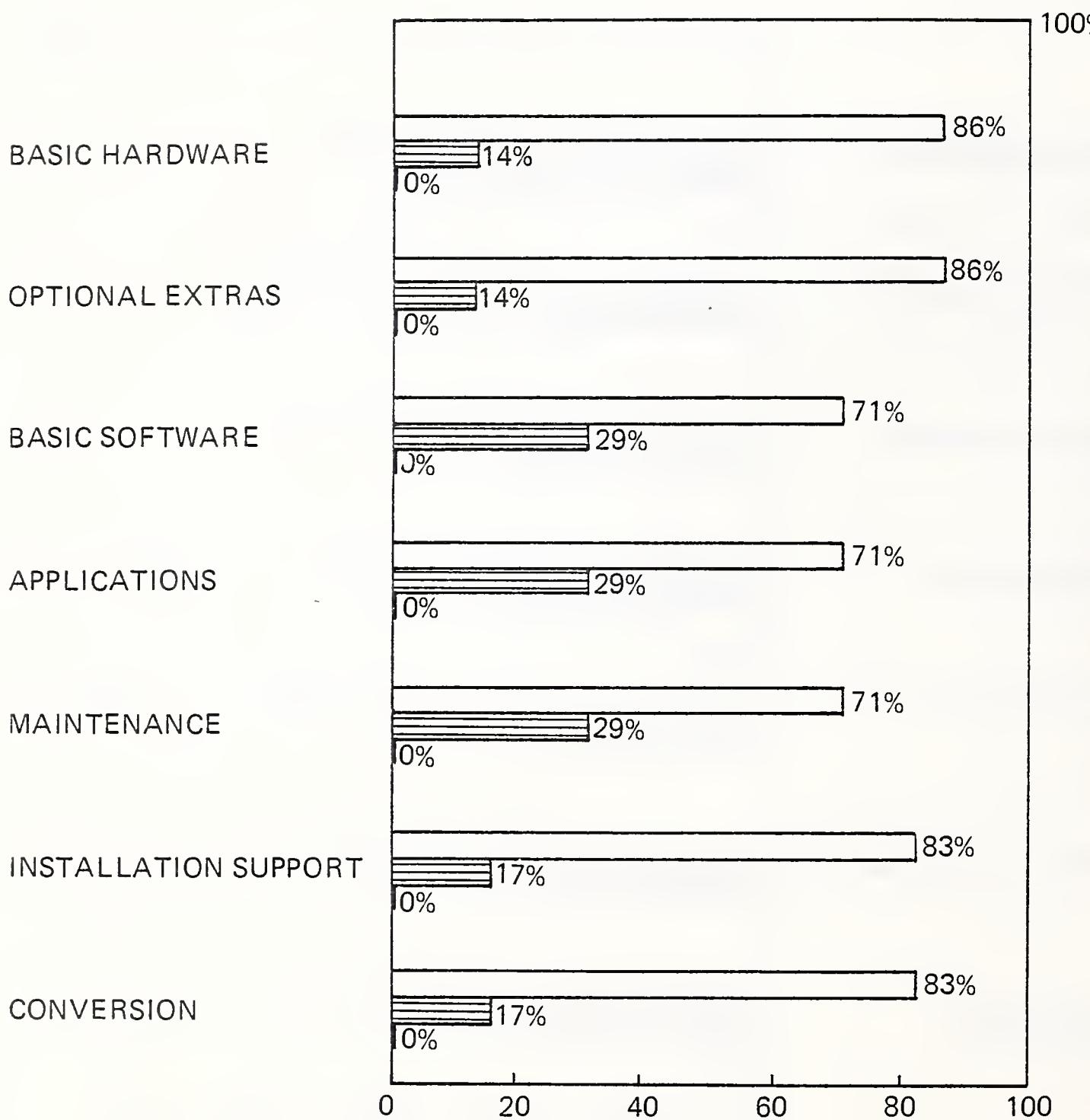


EXHIBIT V-28

RESPONDENTS PREFERENCE FOR INCLUSIVE OR
SEPARATE TARIFF BY ITEM

FRANCE

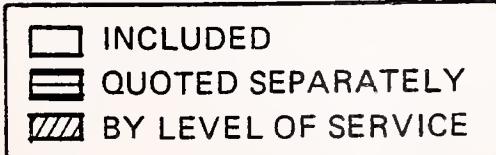
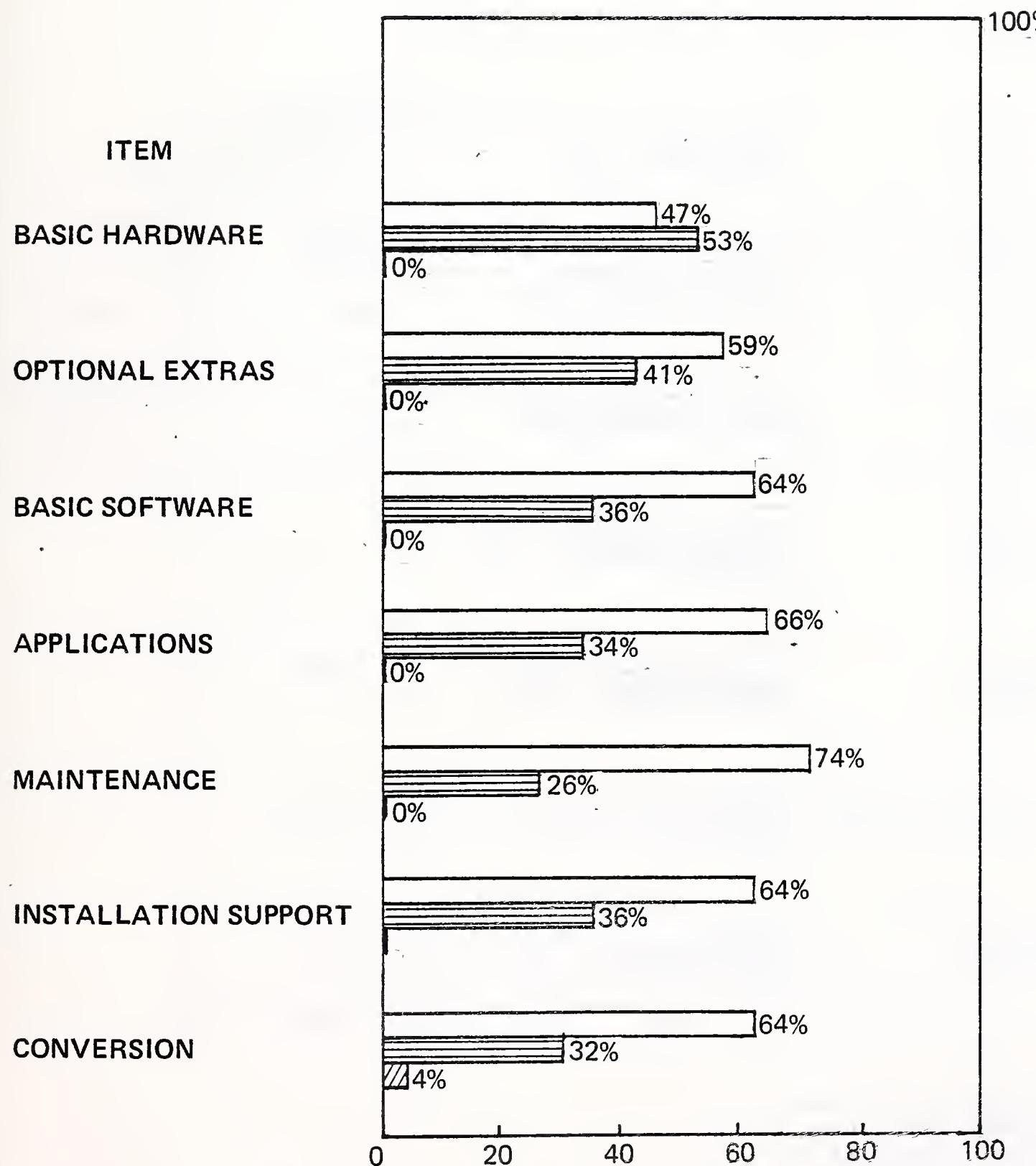


EXHIBIT V-29

RESPONDENTS PREFERENCE FOR INCLUSIVE OR
SEPARATE TARIFF BY ITEM

WEST GERMANY

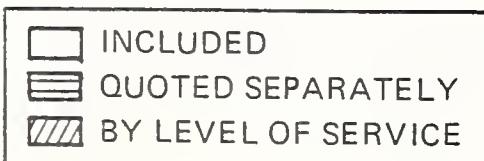
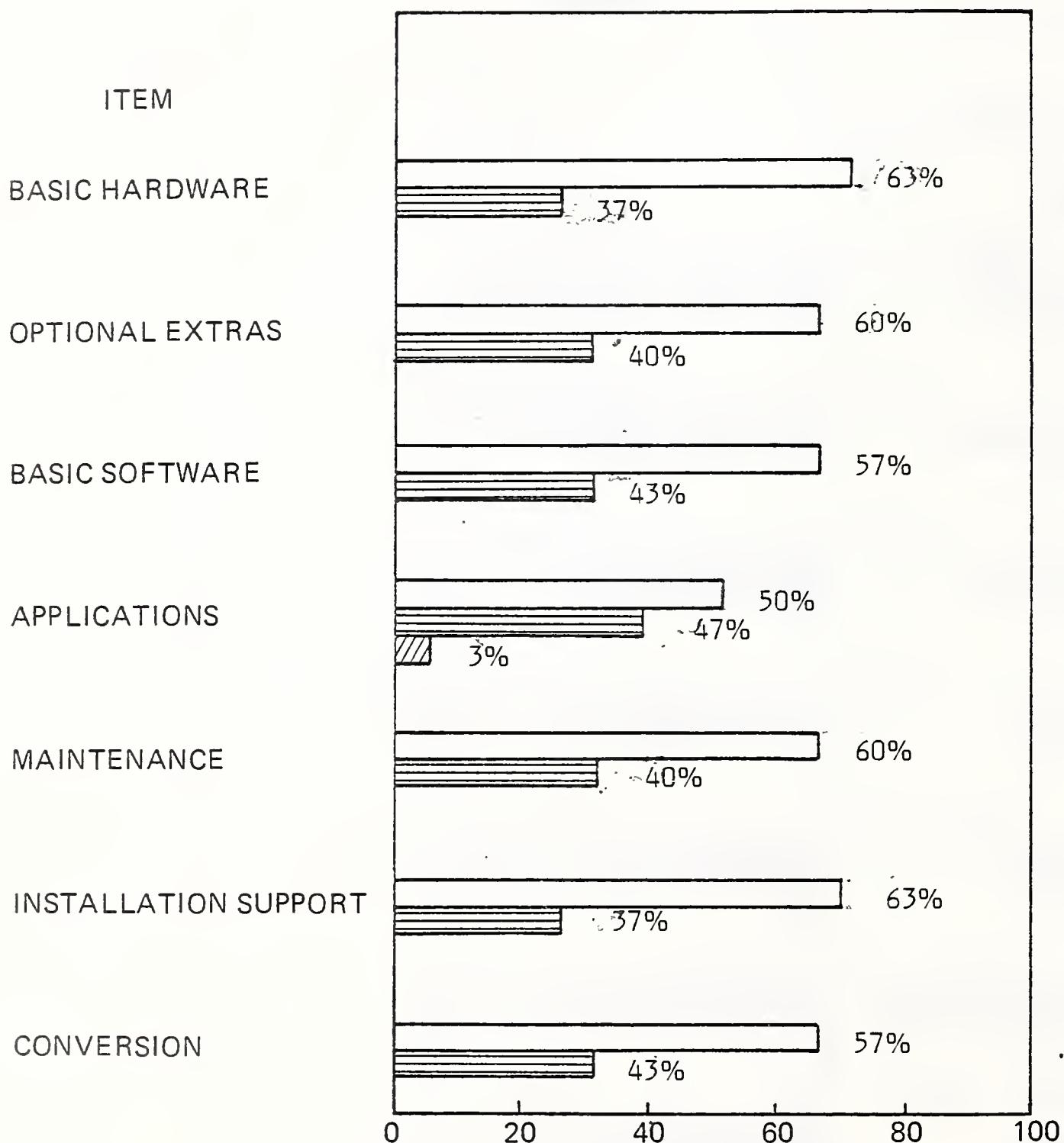


EXHIBIT V-30

SHOULD MINICOMPUTER CONTRACT BE
ALL INCLUSIVE OR SEPARATELY "TARIFFED"?
% RESPONSE, SYSTEMS/SOFTWARE HOUSE

RESPONSE	FRANCE	W. GERMANY	BENELUX	AVERAGE
ALL INCLUSIVE	58%	63%	75%	59%
SEPARATELY TARIFFED	42%	37%	25%	41%

EXHIBIT V- 31

CONTRACT PREFERENCE, END-USERS
PERCENT RESPONSE

	FRANCE	WEST GERMANY	BENELUX	WEIGHTED AVERAGE
● RENTAL	50	78	55	63
- 1 YEAR	6	11	11	9
- 2 YEARS	6	22	11	14
- 3 YEARS	9	36	11	21
- 3-5 YEARS	26	11	11	18
- WITH OPTIONAL PURCHASE	3		11	3
● BUY	40	-	-	18
● LEASE	3	-	-	1
● OTHER/UNDECIDED	7	19	45	18

EXHIBIT V-32

HOW DO YOU PREFER TO FINANCE YOUR SMALL
EDP EQUIPMENT? SYSTEMS/SOFTWARE HOUSES PERCENT RESPONSE

OPTION	FRANCE	WEST GERMANY	BENELUX	WEIGHTED AVERAGE
• PREFER RENT ONLY		8		
• PREFER LEASE ONLY		8		
• PREFER PURCHASE ONLY	73	—	—	(30%)
• PURCHASE AND LEASE		8	20	(8%)
• RENT AND PURCHASE		8		(4)
• LEASE AND RENT	27	8	20	(19)
• ALL THESE REQUIRED	—	58	60	(37)

- In Benelux, basic software, application software and maintenance are increasingly expected to be separately tariffed, while conversion costs, installation costs and all hardware are expected to be included in a single contract.
- In France there is a very strong tendency to require that vendors itemize all parts of the systems sold; in particular, basic hardware should be itemized.
- In West Germany a varying percentage of users seek separately tariffed products and service, foremost among which is application software. But in all of the items listed in Exhibit V-29, a substantial proportion of users prefer separately tariffed products and services.
- Exhibit V-30 shows the preferences of the SSCI, which are, naturally, the opposite: they wish to be able to count on the support of the vendors on a fixed-contract basis.

O. CONTRACT PREFERENCES

- End users prefer rental to purchase, by a 50/40 margin in France, but by far larger margins in West Germany (78%) and Benelux (55%) - (see Exhibit V-31).
- 3 years or more rental period is preferred by over half of those preferring rentals.
- SSCI are mainly interested in either purchase or lease (see Exhibit V-32). Very few of the West German SSCI think that current minicomputer prices have stopped them from applying minicomputers to existing needs; basically end users in West Germany will pay the price for a well-defined application requirement.
- In France and Benelux the opposite is the case: 50% of the French SSCI and 66% of the Benelux SSCI believe that price is the main stumbling block to applying minis to existing requirements.

- Comments included:

- "there is a need for specialized minis which would permit specific applications",
- "costs are approximately 20% too high at the low end",
- "software costs are the main problem for clients",
- "peripheral costs allow only low price small configurations; larger configurations become rapidly too costly",
- "small establishment market is virtually untouched due to high system costs".

P. IMPORTANCE OF UPWARDS COMPATIBILITY

- The object of this question, of which the end-user results are shown in Exhibit V-33, and the SSCI results in Exhibit V-34 was to (i) identify whether the compatibility of the low-end model with the higher models of the same line was necessary, and (ii) whether compatibility with other (competitive) hardware was an issue.
- In both cases, the answer was a resounding "yes".
- For the SSCI, the question was further divided into hardware and software compatibility: in this case there was a strong requirement for software compatibility.

Q. SHORTCOMINGS OF PRESENT LOW END MINICOMPUTERS

- The comments of both end users and SSCI on this subject need to be examined critically: they range from the generic to the specific. As such they are either interesting (but not practical), or significant because of the implications they have for a low-end system.

EXHIBIT V-33

IMPORTANCE OF UPWARDS COMPATIBILITY
END USERS, PERCENT RESPONSE

	FRANCE	W. GERMANY	BENELUX	AVERAGE
NECESSARY	89%	81%	75%	51%
NOT NECESSARY	11	19	25	49

DESIRABILITY OF COMPATIBILITY WITH OTHER HARDWARE

NECESSARY	82%	82	86%	89%
NOT NECESSARY	18	18	14	11

EXHIBIT V-34

IS UPWARDS COMPATIBILITY DESIRABLE
WITH LARGER MINICOMPUTERS?

	<u>FRANCE</u>	<u>W. GERMANY</u>	<u>BENELUX</u>	<u>AVERAGE</u>
● In general, yes	90	83	100	88
● Hardware Compatibility	60	58	67	60
● Software Compatibility	80	83	67	80

Note: - each question is % of all responses and overlap (do not add to 100%).

- Exhibit V-35 lists the end user comments and Exhibit V-36 is the systems/software houses.

R. EVALUATION OF MINICOMPUTER VENDORS

- Systems/Software houses and Users evaluate their suppliers differently. Although the consolidation of responses into a European summary (see exhibits V-37/40 and V-41/4) produces fairly similar opinion profiles, when examined of country level significant differences emerge:

France

- Whereas end users in France see MAINTENANCE as a vital issue in evaluating a vendor, systems houses only see this as moderately important. The roles are reversed in the case of EASE OF USE which is considered an indispensable asset by systems software houses. EASE OF USE is only a moderately important issue to end users.
- COST is of more importance to end users than to systems software houses. Over half of the user respondents claimed this as important although only one third of systems software houses agreed.
- The VENDOR'S NAME was of equal importance to both end users and systems/software houses; both samples accorded this factor greater than 40% rating.

West Germany

- The West German respondents from both samples demonstrated a high degree of consistency according, for example, over 70% priority to the matter of SYSTEM RELIABILITY in both cases. Both samples rated COST at around 60% whilst HARDWARE performance also rated in the same range (56 - 63%).

EXHIBIT V-35

SHORTCOMINGS OF PRESENT LOW-END MINICOMPUTERS
END USERS COMMENTS

FRANCE

"TOO LIMITED IN MODULARITY AND UPWARDS COMPATIBILITY."

"LOW END SHOULD HAVE SAME DISKS AND DATA CAPTURE
PROCEDURES AS HIGHER MODELS."

"LOW END MUST BE AN INTEGRAL PART OF LINE."

"MAIN PROBLEMS ARE SOFTWARE COMPATIBILITY AND DIFFERENT
FILE ORGANISATIONS."

"PROBLEM IS BASIC SOFTWARE: NEED MORE PERFORMANCE LANGUAGES."

"OPERATING SYSTEM SHOULD BE TRANSPARENT TO USER."

"MEMORY AND DISK SIZE ARE TOO SMALL TO BE PRACTICAL."

WEST GERMANY

"MAINTENANCE IS NOT GOOD; RELIABILITY COULD BE BETTER."
(SEVERAL)

"BUSINESS SOFTWARE IS INADEQUATE; NEEDS TO BE IMPROVED."

"BASIC SOFTWARE AND LANGUAGES NEED TO BE COMPATIBLE WITH
THE MAIN COMPUTER."

"DISK AND MEMORY CAPACITY IS TOO SMALL."

"IMPROVED DATABASE SYSTEM COULD BE ATTRACTIVE."

"MACHINES SHOULD BE DESIGNED FOR BETTER RELIABILITY: THEY
BREAK DOWN TOO OFTEN."

"WE LIKE QUICK AND EASY-TO-LEARN SYSTEMS, REQUIRING LITTLE
TRAINING."

"PERIPHERALS SHOULD BE CHEAPER; A LOW COST CPU DOESN'T
MEAN MUCH ON ITS OWN."

EXHIBIT V-35 (contd)

SHORTCOMINGS OF PRESENT LOW-END MINICOMPUTERS (CONTD)
END USERS COMMENTS

BENELUX

"BETTER MODULARITY, COMPATIBILITY AND FLEXIBILITY."

DISK FILE MANAGEMENT IS NOT COMPLETE."

"TOO MANY HETEROGENEOUS MINIS ON THE MARKET."

"NEED FOR BETTER TRAINING AT USER LEVEL AND STANDARDIZATION
OF SOFTWARE."

"MINIS MUST BE COMPATIBLE WITH MAINFRAME: WE ARE PHASING OUT
DEC BECAUSE WE'VE BOUGHT HONEYWELL 66s."

EXHIBIT V-36

SHORTCOMINGS OF PRESENT LOW-END MINICOMPUTERS
SYSTEMS/SOFTWARE HOUSES

BELGIUM

"AMERICAN HARDWARE IS MORE RELIABLE THAN EUROPEAN."

"AT PRESENT INTERACTIVE LANGUAGES AND DATABASE MANAGEMENT SOFTWARE IS VARIABLE IN QUALITY."

"SOFTWARE QUALITY IS BAD, FROM ALL MANUFACTURERS."

HOLLAND

"THE HANDLING AND OPERATING SYSTEMS ARE POOR."

"COMPILERS FOR BUSINESS APPLICATIONS SHOULD BE MORE FLEXIBLE."

WEST GERMANY

"RELIABILITY OF HARDWARE AND PERIPHERALS MUST BE IMPROVED."

"SYSTEM SOFTWARE IS INADEQUATE AND GENERALLY NOT COMPLETELY TESTED WHEN RELEASED."

"HIGH LEVEL LANGUAGES ARE A MUST, BUT SHOULD BE STANDARDIZED BETWEEN MANUFACTURERS."

"DELIVERY OF MACHINES MUST BE TWO MONTHS OR LESS."

EXHIBIT V-36 (cont'd)

SHORTCOMINGS OF PRESENT LOW-END MINICOMPUTERS
SYSTEMS/SOFTWARE HOUSES (CONTD)

FRANCE

"PROBLEMS WITH SEMS MAINTENANCE, MEANTIME TO RESPOND IS TOO LONG."

"TECHNICAL SUPPORT FOR BOTH HARDWARE AND SOFTWARE IS WEAK"

"MAINTENANCE COVERAGE IS PATCHY; THERE ARE GEOGRAPHICAL ZONES WHERE RESPONSE IS TOO LONG."

"COST OF HARDWARE IS STILL TOO HIGH FOR PME." (SEVERAL)

"SOFTWARE COMPATIBILITY NEEDED WITHIN A MANUFACTURER'S RANGE, IT IS BAD ENOUGH BETWEEN MANUFACTURERS."

"PROCEDURES FOR DATA CAPTURE, FORMATTING AND DYNAMIC FILE MANAGEMENT ARE NOT ADEQUATELY DEVELOPED."

"NOT INVOLVED WITH THE MANUFACTURER; WE WANT INVOLVEMENT AT THE FIRST LEVEL, NOT SECOND OR THIRD."

EXHIBIT V-37

HOW DO USERS EVALUATE A MINICOMPUTER VENDOR?

EUROPE

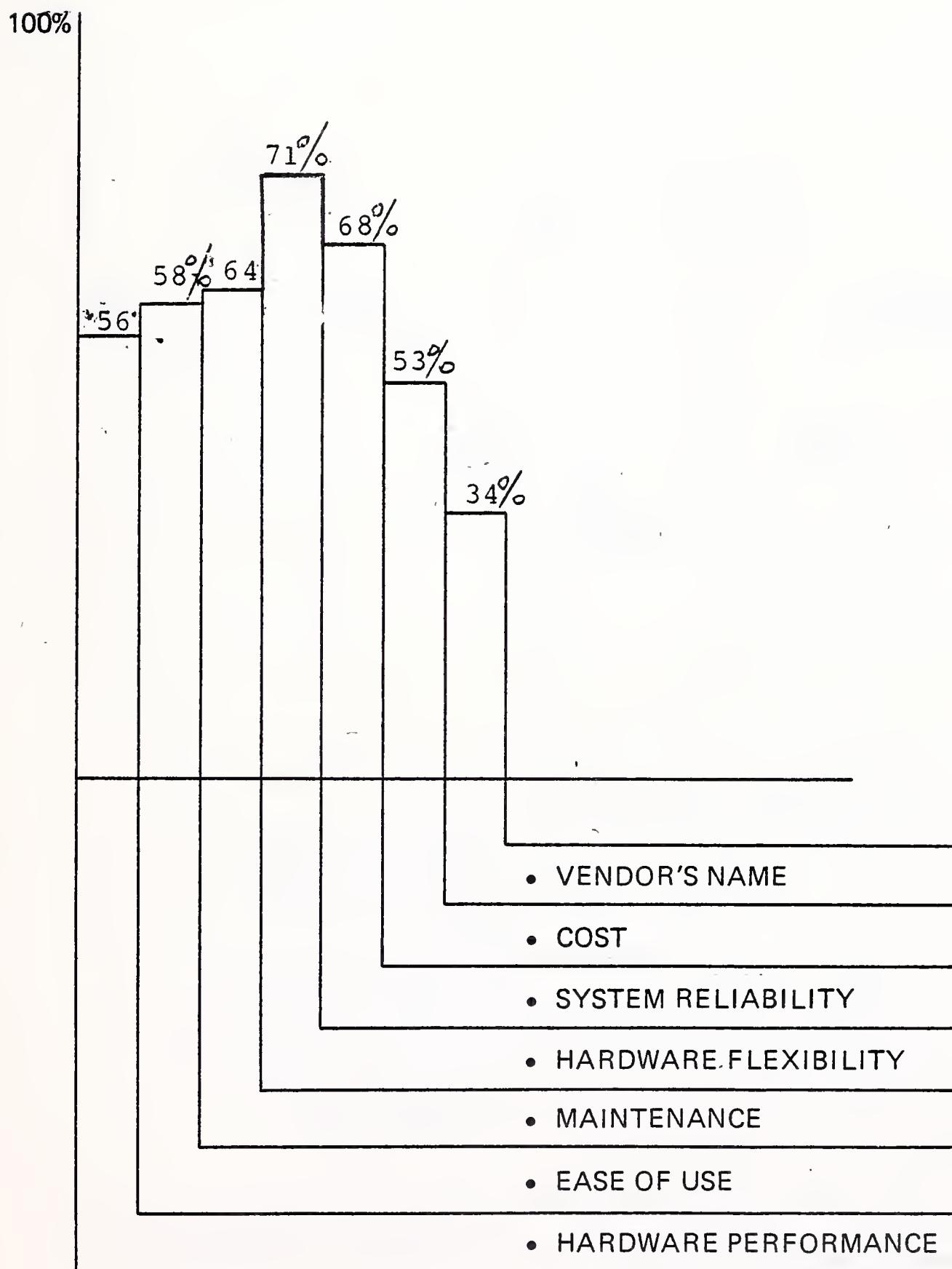


EXHIBIT V-38

HOW DO USERS EVALUATE A MINICOMPUTER VENDOR?

BENELUX

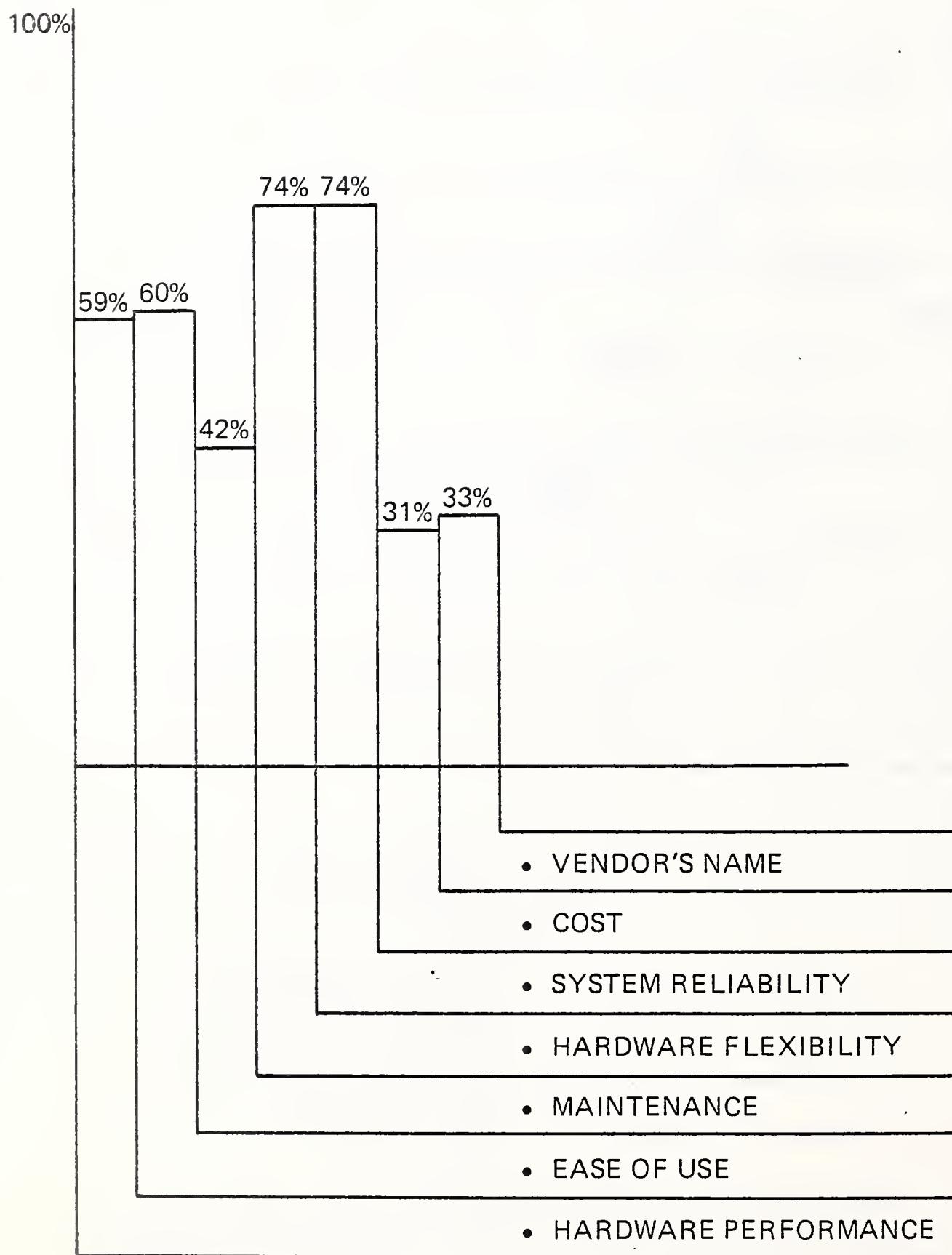


EXHIBIT V-39

HOW DO USERS EVALUATE A MINICOMPUTER VENDOR?

FRANCE

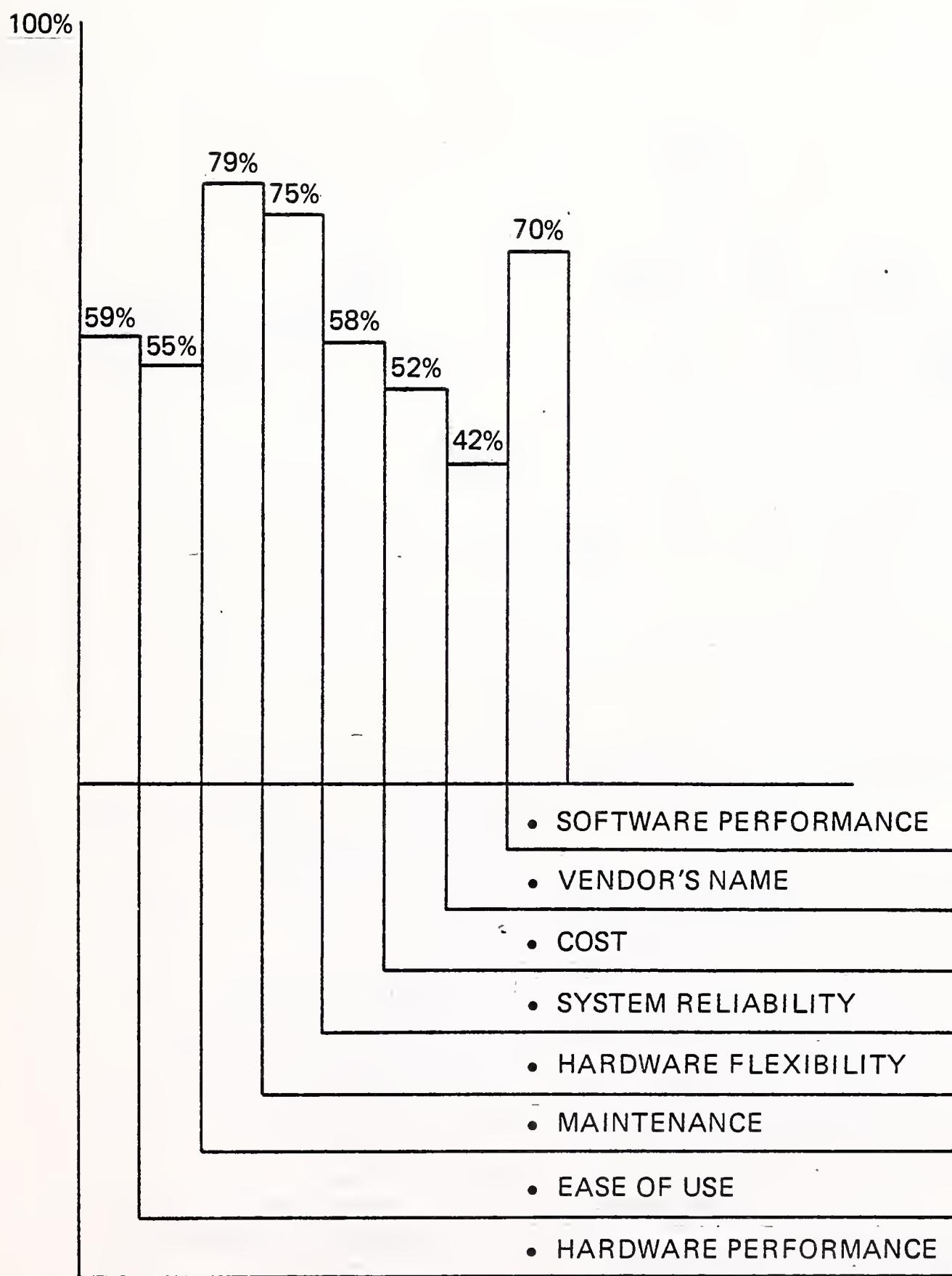


EXHIBIT V-40

HOW DO USERS EVALUATE A MINICOMPUTER VENDOR?

WEST GERMANY

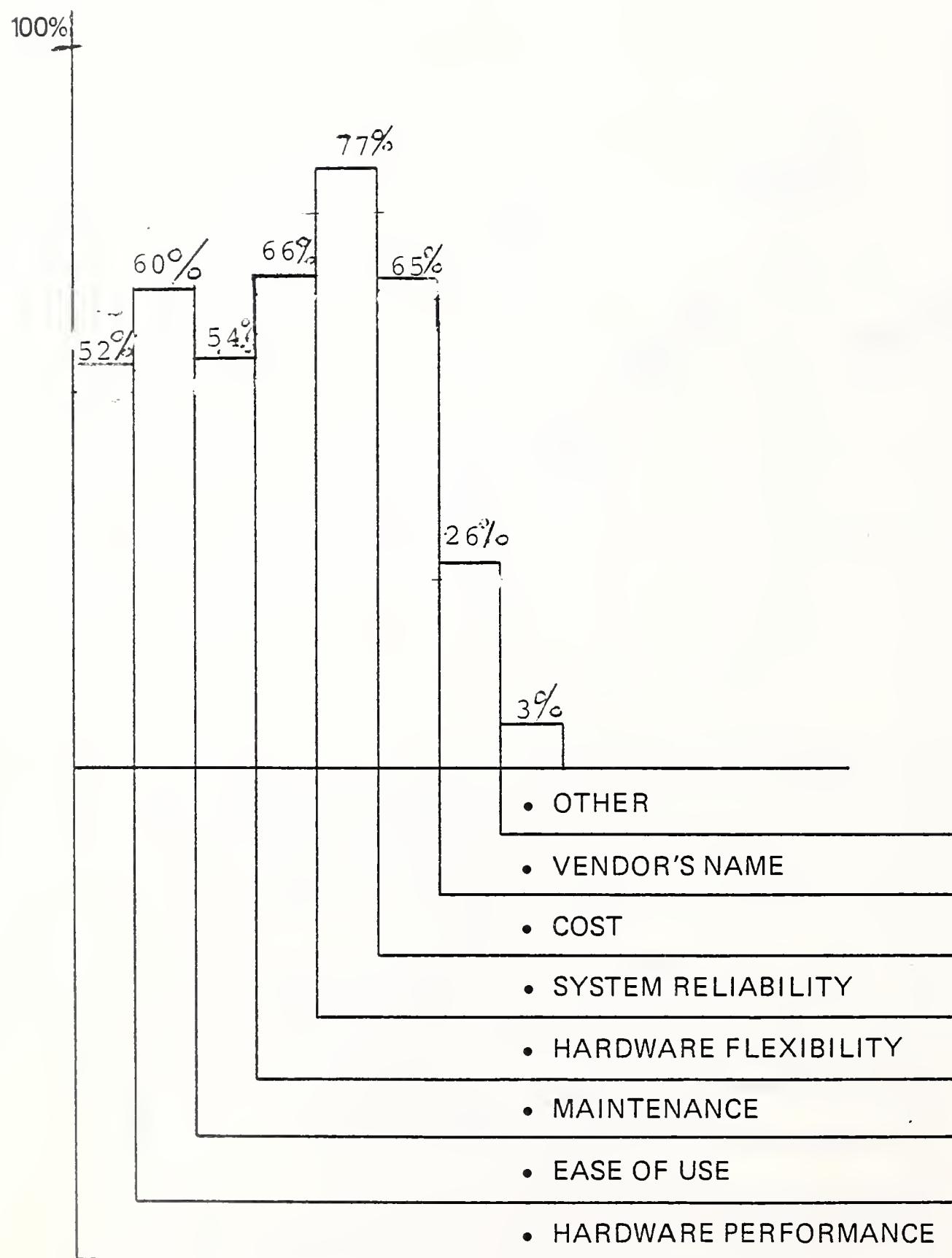


EXHIBIT V-41

HOW DO SSCI EVALUATE A MINICOMPUTER VENDOR?

EUROPE

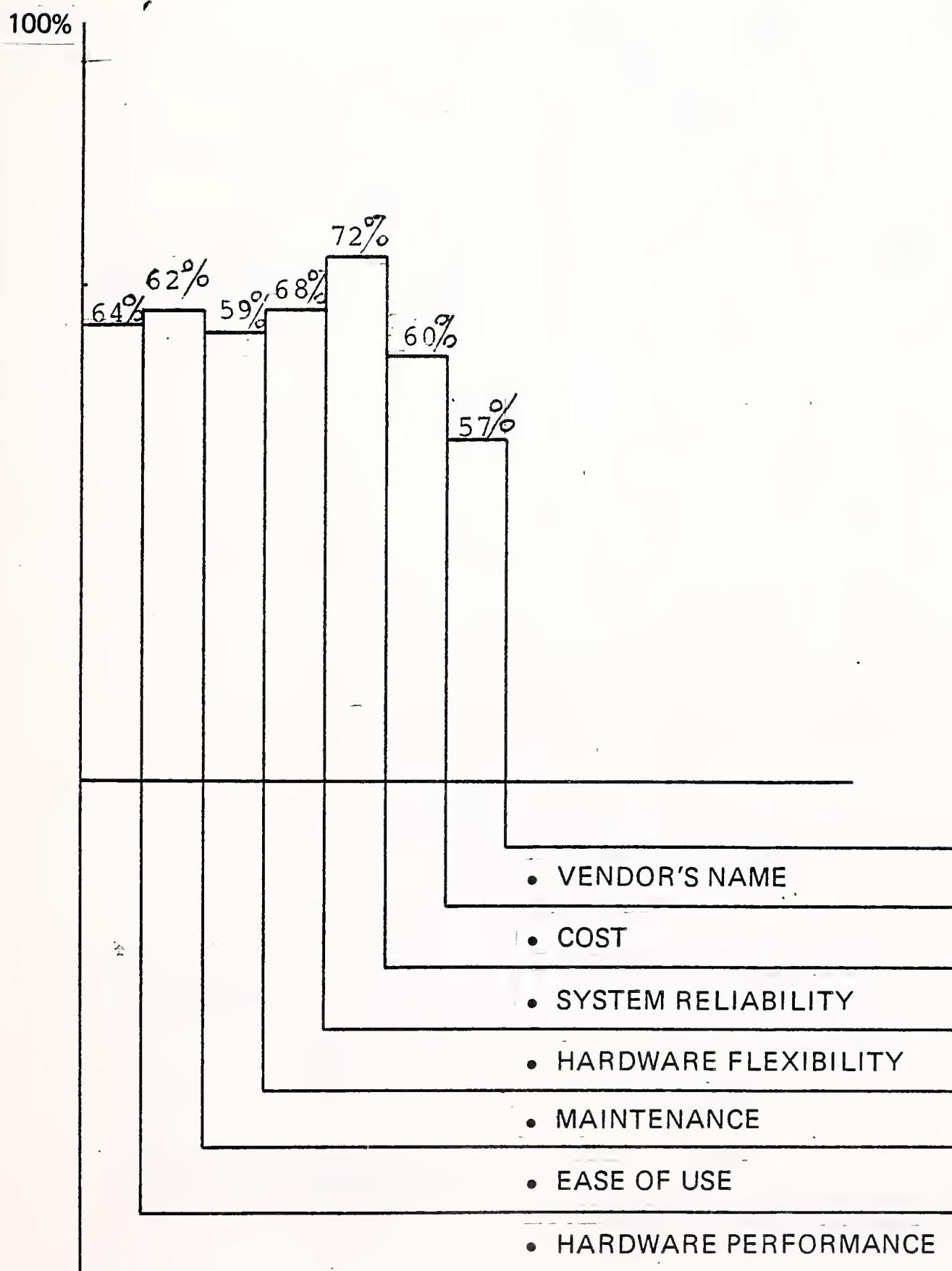


EXHIBIT V-42

HOW DO SSCI EVALUATE A MINICOMPUTER VENDOR?

BENELUX

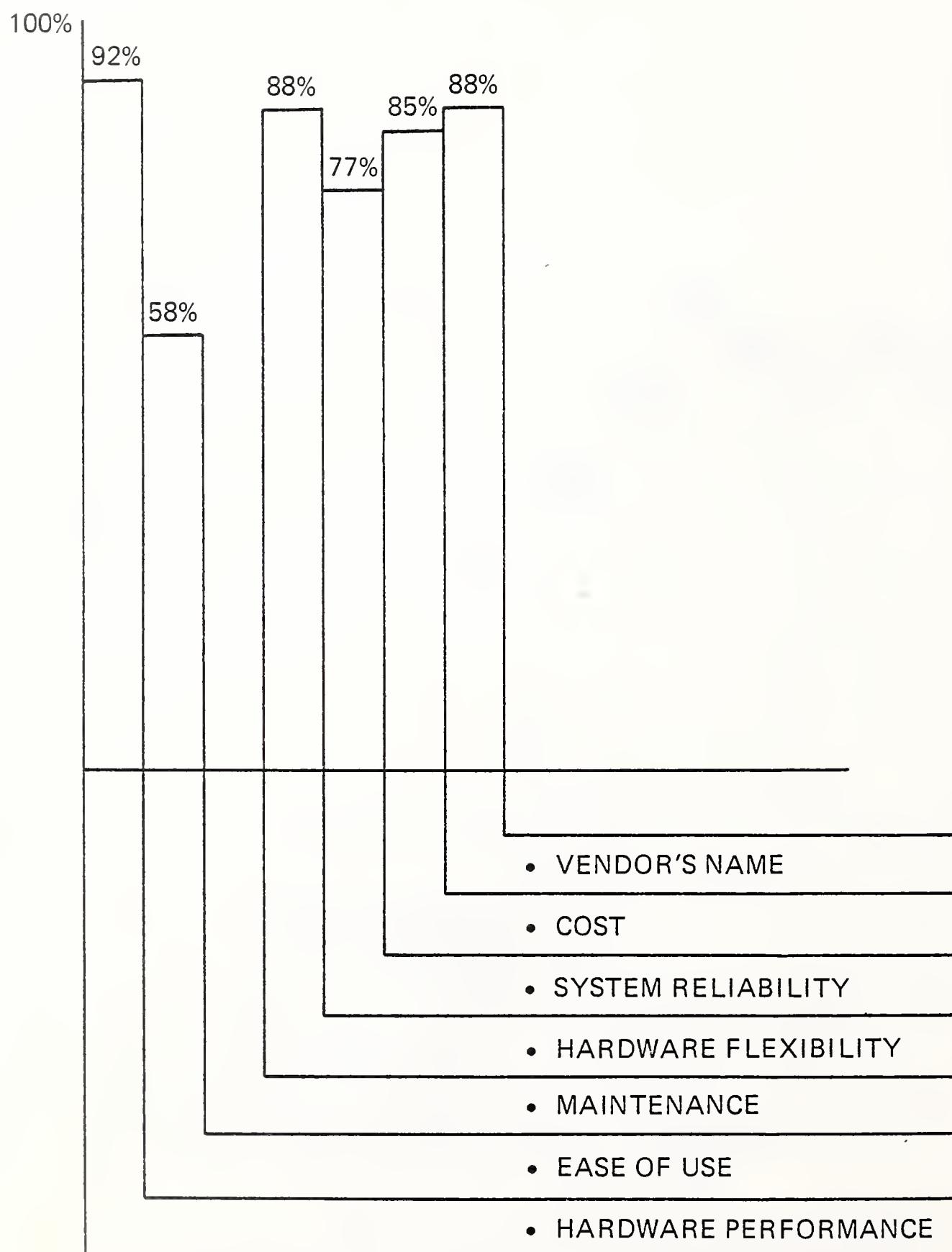


EXHIBIT V-43

HOW DO SSC1 EVALUATE A MINICOMPUTER VENDOR?

WEST GERMANY

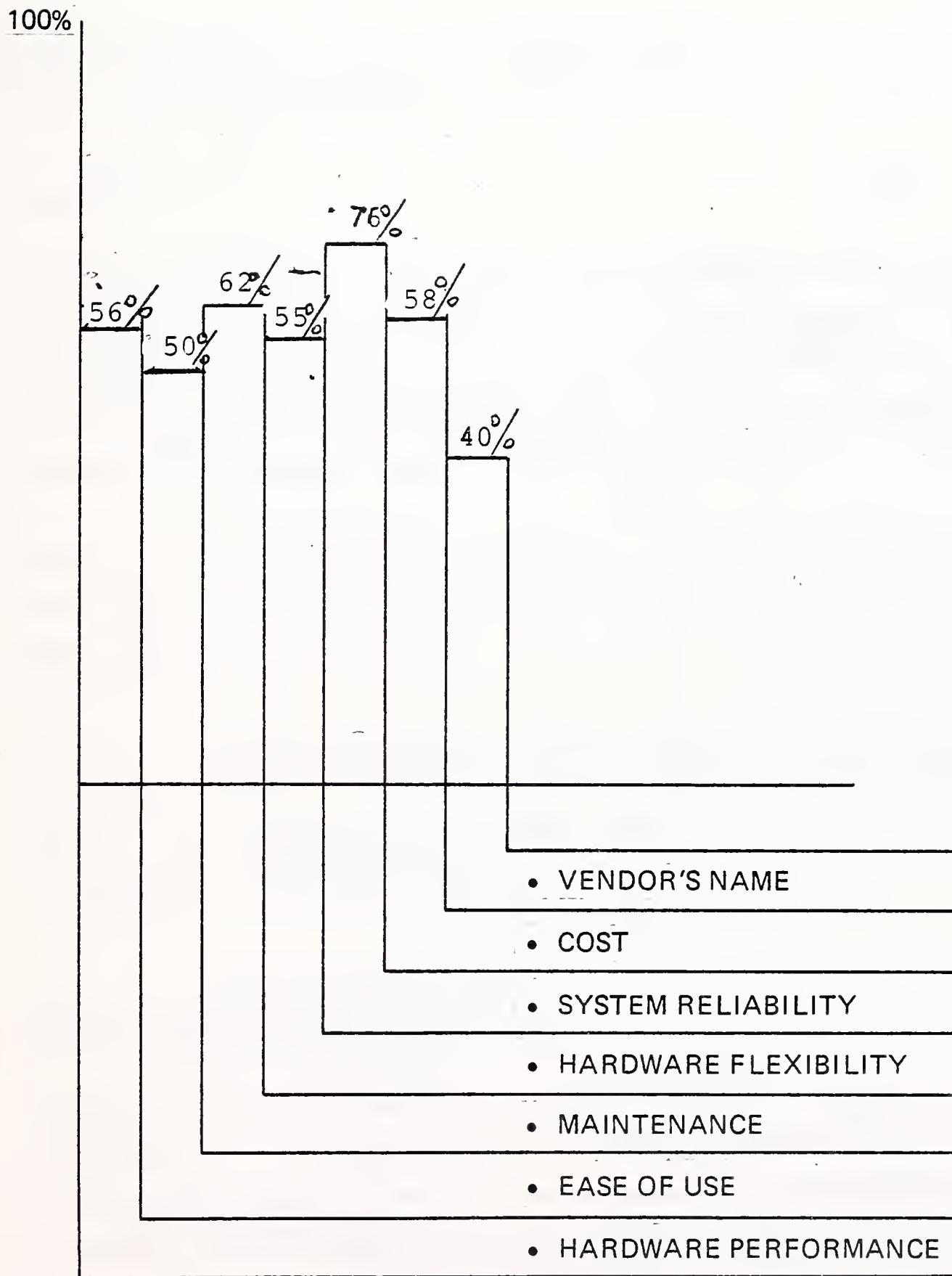
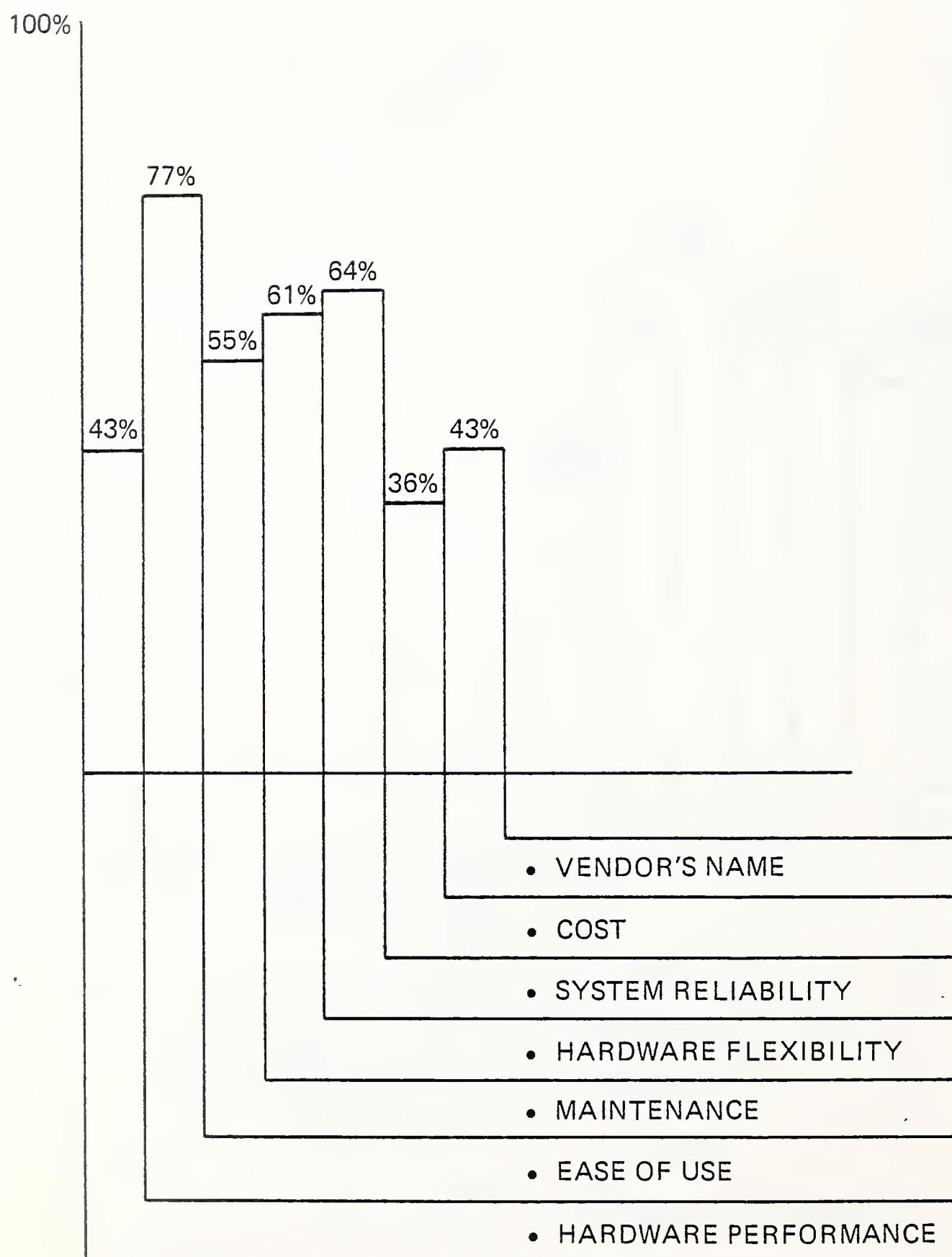


EXHIBIT V-44

HOW DO SSCI EVALUATE A MINICOMPUTER VENDOR?

FRANCE



- VENDOR NAMES were of little apparent importance to end users but systems software houses saw this aspect as more important rating it at 43%. In actual fact, of course, there is no other way that users or systems houses can judge the quality of a product they have no experience of, other than by the name it has.

- MAINTENANCE was seen as an important issue by systems software people and of significant importance by end users who accorded this aspect 54%.

Benelux

- The dramatically high response levels amongst systems/software people in this market are indicative of the narrow range of criteria upon which judgements are made. The preoccupation with HARDWARE PERFORMANCE, HARDWARE FLEXIBILITY and VENDORS NAME are perhaps a reflection of the number of IBM equipped operations which exist in Belgium.

- Amongst Users, the major areas of importance are seen as SYSTEMS RELIABILITY and HARDWARE FLEXIBILITY, both areas being considered of equally high priority.

- As with French and West German end users, those in Benelux accord a lower priority to the VENDOR NAME but MAINTENANCE, whilst seen as a dominant issue in France and a fairly important issue in West Germany, is rated as important by 40% of Benelux users.

S. USE OF SYSTEMS/SOFTWARE HOUSES

- Although the obvious use of a systems or software house is to develop application software or convert files or programs from one system to another, an increasing proportion of users are turning to them for the selection of the hardware. This can either occur in the form of management consulting or in the form of turnkey solutions that incorporate the hardware.

EXHIBIT V-45

WOULD YOU USE A SYSTEMS/SOFTWARE
HOUSE FOR - - - - ?

FACTOR	FRANCE	W. GERMANY	BENELUX	AVERAGE
CHOICE OF HARDWARE	17	14	-	14
APPLICATION SOFTWARE DEVELOPMENT	43	42	33	42
FILE/PROGRAM CONVERSION	14	14	11	14
GENERATION OF TEST DATA	11	8	-	9
EXCESS WORKLOAD PROCESSING	49	39	33	43

EXHIBIT V-46

WOULD YOU LIKE EQUIPMENT MANUFACTURER
TO SUGGEST A SYSTEMS/SOFTWARE HOUSE
FOR INSTALLATION ASSISTANCE /PROGRAMMING?

FRANCE

- MAJORITY (79.4%) DON'T WANT TO HAVE ANY SUGGESTIONS; THEY WILL MAKE THEIR OWN CHOICE.
- ONLY 20.6% THOUGHT IT WAS A GOOD IDEA.

WEST GERMANY

- MAJORITY (77%) WANT THE EQUIPMENT VENDOR TO SUGGEST A SOURCE OF PROGRAMMING SUPPORT.

BENELUX

- NEARLY TWO THIRDS (62.5%) EXPECT TO BE PROVIDED WITH LIST OF SYSTEM/SOFTWARE HOUSES.

EXHIBIT V-47

WOULD YOU PREFER THE MANUFACTURER TO RECOMMEND
A LIST OF SYSTEMS/SOFTWARE HOUSES TO AID INSTALLATION?

	<u>FRANCE</u>	<u>W. GERMANY</u>	<u>BENELUX</u>	<u>AVERAGE</u>
Prefer	42	58	40	48
Prefer not	25	33	20	28
Indifferent	33	8	40	25

- Exhibit V-45 summarizes the user feelings on the subject. Excess workload processing applies to Batch or Remote Batch services, topped up with interactive processing, (and is included under the title SSCI but not, of course, in systems/software houses), unless they have a processing department/division.
- The selection of which systems/software house to use (and whether the manufacturer should be involved in orienting the user towards a given source of support) is examined in Exhibits V-46 and V-47.
- In Exhibit V-46 it is the users own view which is expressed:
 - in France the majority don't want to be told anything and prefer to make their own choice,
 - in Germany users expect the vendor to be able to do this (and suppose that in doing so he will take partial responsibility for the supplier of software in France),
 - in Benelux a similar view to that expressed by West German users prevails.
- In Exhibit V-47 it is the systems/software house view that is expressed, and overall they are in favour of working more closely with the equipment manufacturer.
- The delivery cycle for equipment required by systems software houses is as follows:

EXHIBIT V-48

WOULD YOU ACCEPT TO MAINTAIN YOUR
MINICOMPUTER YOURSELF?

A. USERS

ACTION	FRANCE	W. GERMANY	BENELUX	AVERAGE
EXCHANGE BOARDS	37	47	29	41
RUN DIAGNOSTICS	40	67	29	62
FETCH SPARE PARTS FROM CENTRAL VENDOR LOCATION	6	25	14	15
IN GENERAL, ACCEPT PARTIAL RESPONSIBILITY	51	75	71	64
WOULD ACCEPT TO USE A THIRD PARTY MAINTENANCE SERVICE	49	36	25	70

EXHIBIT V-48 (CONT'D)

WOULD YOU ACCEPT TO MAINTAIN YOUR (CONT'D)
MINICOMPUTER YOURSELF?

B. SYSTEMS/SOFTWARE HOUSES, % RESPONSE

ACTION	FRANCE	W. GERMANY	BENELUX	AVERAGE
RUN DIAGNOSTICS	33	50	20	38
EXCHANGE BOARDS	33	25	20	28
FETCH SPARE PARTS FROM CENTRAL VENDOR LOCATION	25	8	-	14
FETCH SPARE PARTS FROM LOCAL VENDOR LOCATION	8	8	-	7

What Delivery Cycle do you Need?
Systems/Software Houses, % Response

<u>DELAY</u>	<u>France</u>	<u>W. Germany</u>	<u>Benelux</u>	<u>Average</u>
• 2 months or less	20	*	50	29
• 2-3 months	-	*	25	7
• 3 months or less	30	*	-	21
• 3-4 months	20	*	-	14
• 4 months or less	20	*	-	14
• Not specified	10	*	25	15

Note:

* West German companies expect minicomputer manufacturers to be responsive to their requirements and need from 1 month to 3 months maximum delay, depending on need.

T. SYSTEM MAINTENANCE

- The idea was explored that users and/or systems/software houses should accept to (at least partially) maintain the system they use/install, (see Exhibit V-48).
- Certain duties of the maintenance function are acceptable to users such as running diagnostic and exchanging boards, but in general they are only willing to take on partial responsibility for the maintenance function, (see Exhibit V-48). Systems and software houses have a similar view.
- The importance of field maintenance characteristics, satisfaction with mean time to respond, mean time to repair etc., are shown in Exhibits given in appendix.

VI. / VENDOR ANALYSIS AND COMPETITIVE DEVELOPMENTS

VI. VENDOR ANALYSIS AND COMPETITIVE DEVELOPMENTS

- Eight interviews with the competition were carried out in Europe and the United States, as selected by SEMS. The vendors interviewed were:

- DEC	(U.S.) -	Kienzle	(Europe)
- H.P.	(U.S.) -	Nixdorf	(Europe)
- Data General	(U.S.) -	CII-Honeywell Bull	(Europe)
- Texas Instruments	(U.S.) -	Philips	(Europe)

- The summary of the data obtained, based on the vendor questionnaire shown in Appendix F follows:

A. COMPETITIVE VENDOR STRATEGIES

- IBM, until the introduction of the Series/1, was not a serious contender for the minicomputer market. For the first year of the Series/1 introduction, the product was not used as a competitive tool to attack the whole market, but was concentrated on the defence of the IBM 370 base of large/very large computers, against the encroachment of small system vendors such as Nixdorf, Olivetti, Philips, Kienzle and the minicomputer vendors such as DEC, T.I., H.P. and Data General.
- The Series/1 has since moved into its second phase of attacking the mini-computer market with the introduction by IBM of volume discounts (which the product has been sold without in 1978).
- The system/software houses have not been slow to recognize the potential offered by the IBM name in turnkey selling, and have began to make heavy inroads on DEC business as a result.

- The danger, for other minicomputer vendors, is that the lure of the IBM name may tie up the efforts of too many system/software houses, reducing the amount of support available from third party sources for new hardware.
- DEC has the philosophy of producing the best price/performance product in all of the minicomputer model areas, from very small to very large. DEC realises that with over 150,000 minicomputers installed world-wide, it has reached the market dominance stage, and can afford to refuse to let any other vendor dictate the pace of change of the price and performance of the markets it serves.
- Data General is a typical example of the minicomputer vendor who has profited from the substantial margins available to companies capable of following the technology wave. DG bases its competitive edge on price and allows a wide range of discount authority to sales managers. The volume of business remains small in Europe, however.
- Hewlett Packard has decided that small computer demand stems from an increase in the quality and volume of data single end users require, and has based many of its products on that approach. H.P. has developed a very high image as a vendor of highly reliable products (although expensive). H.P.'s presence in Western Europe is growing and is being developed from the end-users upwards, rather than downwards from the company (or even establishment).
- CII-Honeywell is playing the "integrated systems" card, i.e. extending the image of the 60 series to include minis as part of the "unified" product catalogue. Level 6s are now being used as terminal controllers, network nodes (in the DSE environment) and shortly in office systems. This approach is a strong one because nearly all of the end-users interviewed were concerned at the level of compatibility of their small system hardware with their main systems. One user told us he had decided to return his DEC PDP/11s because he had just bought Honeywell mainframes. He was perfectly happy with the DEC products but they were just not compatible, so they were being returned.

- Nixdorf has established itself as a truly international small business system vendor in both Western Europe and the United States. Nixdorf's recent cash problems are now resolved and the company is selling large quantities of systems. In 1978, 6800 small systems were shipped, nearly four times as many as SEMS.
- Kienzle is an interesting vendor, from the SEMS point of view. Two years ago, Kienzle had reached the point where their own manufacturing capabilities no longer allowed adequate margins on their small systems, and the question was "how do we continue to penetrate the low-end system markets?" The solution adopted was to use a T.I. minicomputer, on an OEM contract, to support Kienzle peripherals. Margins were improved enough to allow continued low-end system sales. Now Kienzle is back to the same problem again, struggling under marginal profitability and growing costs. Kienzle is competitive in W. Germany and occupies 22% of the market, but is not well implanted elsewhere. In 1978 Kienzle shipped 3000 systems - but volume does not always mean profits.

B. DISTINCTION BETWEEN A MICRO AND A MINI

- Basically the vendors all agree that the micro is a technological tool, not a product per se. It is used as a building block for the construction of systems. There is no real conflict, therefore, between a mini and a micro.
- Their comments were as follows:
 - H-P
 - "we don't distinguish between a mini and a micro: we look at what it can do, how accessible it is to the user"
 - "micros are just another component for design engineer"
 - "compatibility within family is mandatory"
 - D-G
 - "it's a shame we spend so much time on this distinction!"

- "micro is single/dual chip, available at chip, board or box level"
- "mini is available in a variety of packaged configurations"
- DEC - "a microprocessor is a chip: put a box on it and it is a minicomputer"
- TI - "there is no need to distinguish between the two: price is the main factor, format the next i.e. board versus box or work-station versus system"
- KIENZLE - "we distinguish between them on several levels:
 - . price basis: micro = 1K-5KDM sales price
 - . product basis: mini has file management, and is multi-functional, micro is dedicated
 - . software basis: micro has one language mini has several
 - . application basis: micro is not on-line"
- PHILIPS - "if it is a building block it is a micro: if it is a system with peripherals it is a minicomputer".

C. TRENDS IN MINICOMPUTER PRICING, PERFORMANCE AND SUPPORT

- In general it is felt that today's prices of \$15-30,000 would drop by half, (eroding by 20% per annum), over the 1979-1983 time frame, while improving performance by 20% per annum at the same time.
- This is not expected to impact the total market because the growth in volume is such that it easily offsets the price erosion.
- One vendor (T.I.) believes there will always be a market for a \$30 - 100,000 product whatever happens to performance.

- DEC, H-P, KIENZLE, D.G and T.I. all believe there will be separate micro and mini markets.
- Actual performance levels were infrequently given (confidential) but one vendor thought that the important point was not basic CPU speed but actual throughput speed obtained through improved interface and system software.
- The two performance ranges given, ranged from 150 ns to 400 ns.
- The configurations that can be constructed from their views of (i) 1979, (ii) 1983 are shown in Exhibit VI-1.
- Support is expected to be gradually integrated into the systems themselves:
 - software systems, not hardware systems should be offered which incorporate, invisibly, the required languages, operating system and application support needed for the application in question or that provide the user tools necessary to allow the end user to provide his own processing,
 - data management is important, where the data captured is automatically formatted and files in a manner known only to the system and retrievable by a simple READ/WRITE command, (again invisibly),
 - standard languages are expected to be COBOL, FORTRAN and BASIC,
- Some disagreements exist as to how the programming will occur in future. Generally speaking it was felt that the user should be able to handle customized needs (e.g. industrial applications) while the vendor should handle the commercial applications requirements by either standard software packages or by black box for simple needs, supplemented by third party sources for large, complex applications.

EXHIBIT VI-1

TYPICAL LOW-END MINICOMPUTER CONFIGURATION

<u>ITEM</u>	<u>RANGE TODAY (AVE)</u>	<u>RANGE 1983 (AVE)</u>
• CPU cycle time (ns)	400/600 (500)	100/300 (180)
• Memory Size (KB)	16/64K (48K)	64K/2M (512K)
• Disk Type	Floppy or fixed	Fixed with floppy as support
• Main Disk Storage file size (MB)	2/10MB (8MB)	20/50MB (30MB)
• Printer performance	100cps/-180cps (150cps)	180/200cps (180cps)
• Workstation type	CRT	CRT
"	1/4 (2)	1/8 (5)
"	1/4 (4)	2/48 (16)
• Other - direct data input	1	1
- text screen (4K)	1	1
- extra cards	5/8	more function, less cards

Note: figures in brackets are the average expected.

- Communications requirements were thought to be categorized as follows:
 - single fixed procedure, at low cost, for the defined market of users who have already adopted a norm,
 - several fixed procedures, to handle special requirements or mixed hardware sites.
- The principle procedures required were thought to be:
 - IBM 2780/3780
 - X-25 packet switching.

D. SALES/DISTRIBUTION OF THE LOW-END PRODUCT

- Each vendor has its own way of approaching this problem, due principally to its own philosophy. Solutions being considered were:
 - "industry-oriented distributors (SSCI with sector-level expertise), supplemented by our own sales force for the broader markets;"
 - "home and personal computer shops can do the job for the very high volume low cost systems, provided that the software is well defined; SSCI will go for the larger, more complex systems;"
 - "we'll try the computer shop in a big way, but our own sales force will handle large systems";
 - "distribution will be 50% own network, 25% SSCI and 25% computer shop";
 - "computer shop is best in the long run, but we look to our own sales force for 70% of the business for the moment".

E. TECHNOLOGY DEVELOPMENTS

- The vendors interviewed were not very willing to divulge their plans in this area (since this is where the competition will occur, both in product performance and margin).
- The main points of consensus appear to be:
 - bubble memory will allow greater integration of memory with the CPU on a single chip; the date of introduction was extremely variable, however, with one vendor saying they would have a megabyte bubble memory by 1979 and another saying they would not implement bubbles before 1983 (his opinion might be changed, rapidly!);
 - more functionality on a single board, with vendors having to commit themselves to a configuration and integrate onto the board the required controllers, CPU, memory and port connections expected for the full product's extensions;
 - fixed disc to be included systematically in the low-end product by 1981, in addition to the floppy, which is seen as supporting system software loading, maintenance programs/diagnostics and initial data capture work area;
 - improved system software, (being easier to use, more reliable) and the use of structured languages and "self-tuition" routines.

F. ARCHITECTURE AND PACKAGING

- Again a sensitive area which is not easily established without entering the "industrial espionage" domain.

- Almost all vendors agree that packaging must rely on a limited number of options, but that the optional systems would contain an increasing range of function.
- This is echoed by the expectation that all systems in a range will be based around the same basic package including CPU basic memory, display, diskette and fixed disks. These packages, with the addition of the character printer, have been explored in Section III.
- Architecture must rely, therefore, on the building block principal, which was earlier found by INPUT in its mult-client study of the Series/1: end-users, particularly those who buy minicomputer, like to buy modular, building block systems with which they can construct their own systems.
- Data handling is a crucial problem in today's small systems: it is a complex problem that is just as difficult for the small system user as it is for the large system user.
- Allied to this concept is the need to adequately format and present the results of processing. One vendor commented: "generating the data by processing is easy, passing on that information in a digestible format to the end user is the difficult part". This calls for a lot more attention to be paid to the man/machine interface, rather than the hardware construction of increasingly integrated equipment.
- Running contrary to this integration of the hardware is the unanimous conviction of all of the vendors that each element of a system can now be separately priced, including:
 - basic software (system)
 - compilers/languages
 - application software
 - software maintenance

- customized hardware maintenance (i.e. customer by customer contracts rather than standard)
- installation services
- education

In future, pricing is likely to be based as a software profile, not on hardware components, which reconciles the two trends mentioned above.

G. PRODUCT MAINTENANCE

- More and more small system vendors are losing money on the maintenance service and seeking ways to reduce the service provided. This runs contrary to the:
 - increasing dissatisfaction of end users with the maintenance service provided by vendors, and increasing resistance they have towards increased prices
 - the vendors own market expansion ambitions, driving him further afield, geographically,
 - the trend towards distributed data processing and larger volumes of small systems rather than smaller numbers of large systems.
- Approaches being analysed to control these problems include:
 - having the large end user and the distributor do part of the maintenance task,
 - demanding that the end user execute diagnostics on his own system and attempt to resolve his problem by exchanging boards, before an engineer is sent out,

- remote diagnostic teams working on hardware and software by remote analysis of system failure symptoms, rather than executing these tasks on-site,
- redundant peripherals (particularly terminals) being made available to the end user, as an option to added maintenance costs for better reliability through re-configuration rather than better performance of individual components.

- The obvious solution to this growing problem appears to be improved design of the hardware itself, i.e. prevention rather than cure.

APPENDICES

APPENDIX A: USER CONFIGURATION PREFERENCES

EXHIBIT A-1

CONFIGURATION PREFERENCES
END USERS

ITEM	FRANCE	WEST GERMANY	B/N/L	TOTAL
MEMORY SIZE				
4K	—	3	—	2
8K	5	—	—	2
16K	5	6	16	7
32K	20	13	50	19
48K		6	—	4
64K	10	10	16	11
80K	5	—	—	2
96K	—		—	2
128K	30	29	—	26
256K	10	13	—	11
512K	5	6	—	5
1Meg	10	6	—	7
2Meg	—	6	—	4
MEMORY INCREMENT:				
16K	—	3	—	2
32K	15	10	—	11
48K	5	—	—	2
64K	5	13	17	11
96K	—	3	—	2
128K	—	16	17	11
256K	—	13	—	7
300K	—	6	—	4

EXHIBIT A-2
CONFIGURATION PREFERENCES
END USERS (CONT)

ITEM	FRANCE	WEST GERMANY	B/N/L	TOTAL
PRINTER				
'YES' UNDEFINED	0	16	33	12
CPS:				
30	—	6	—	4
50/60	5	6	—	5
120	10	6	17	9
130	10	3	—	7
180	10	13	17	12
300	—	—	—	
480	5	—	—	2
600	—	—	—	
LPM:				
50	5	10	—	7
200	—	6	17	5
300	5	6	—	5
400-600	20	—	—	7
1200	5	3	17	5
REMOVABLE DISK				
'YES' UNDEFINED	45	13	33	26
1 MB	10	—	—	4
2 MB	—	3	—	2
5-10 MB	5	6	17	7
10 MB	5	6	—	5
20 MB	5	3	17	5
40 MB	—	6	—	4
50 MB	5	—	17	4
60 MB	—	10	—	5

EXHIBIT A-3
CONFIGURATION PREFERENCES
END USERS (CONT)

ITEM	FRANCE	WEST GERMANY	B/N/L	TOTAL
REMOVABLE DISK, NO				
1	-	10	-	5
2	N/A	23	-	12
3	-	6	17	5
4	-	6	-	4
FIXED DISK				
'YES' UNDEFINED	45	6	-	19
5 MB	5	-	-	2
7 MB	10	-	-	4
10 MB	5	-	-	2
40-50 MB	-	5	17	4
60 MB	-	6	-	4
100 MB	-	6	-	4
200 MB	-	6	-	4
560 MB	-	6	-	4
FIXED DISK, NO.				
2	-	19	-	11
3	-	10	-	5
5-10	-	10	-	5
FLOPPY DISK				
'YES' UNDEFINED	55	16	33	32
30K	5	3	-	4
40K	-	3	17	1
50K	5	3	-	4
125K	5	-	-	2
256K	5	3	17	5
1Meg	5	3	17	5
2Meg	-	3	17	4

EXHIBIT A-4

CONFIGURATION PREFERENCES

END USERS (CONT)

ITEM	FRANCE	WEST GERMANY	B/N/L	TOTAL
FLOPPY DISK, NO				
1	5	6	—	5
2	10	26	33	21
3	—	6	—	4
4	—	3	—	7
5-10	—	6	—	4
TAPE				
'YES' UNDEFINED	30	3	—	12
800 BPI	10	26	17	19
1600 BPI	15	23	—	18
CARD READER				
'YES' UNDEFINED	20	—	—	7
80 COLUMNS	15	29	—	21
96 COLUMNS	—	3	—	2
BADGE READER	20	29	51	28
OPTICAL READER	20	15	—	16
OCR/A	5	6	—	5
OCR/B	5	3	—	4
OTHER	5	6	—	5
VDU				
'YES'	90	90	51	86
PAGE SIZE	240/480	5	—	5
	480	10	—	4
	512	—	—	7
	1920	45	26	35
	LARGER	5	13	9

EXHIBIT A-5

CONFIGURATION PREFERENCES
END USERS (CONT)

ITEM	FRANCE	WEST GERMANY	B/N/L	TOTAL
VDU NUMBER				
1	—	10	—	5
2	N/A	6	34	7
3	—	6	—	4
4	—	10	—	5
5	—	6	—	4
5-10	—	19	—	11
20+	—	19	—	11
COMMUNICATIONS INTERFACE				
— 2780	10	6	—	7
— 3780	15	6	29	10
— 3270	20	6	14	12
— X25	15	13	—	12
— TRANSPAC	30	—	—	10
— TELEX	—	10	—	5
— SYNCHRONOUS	55	26	29	36
— ASYNCHRONOUS	35	42	29	38
WORKSTATIONS				
'YES'	75	81	17	71
NUMBER: 1	5	10	—	7
2	5	3	—	3
3	15	16	—	14
4	—	13	—	7
5	10	3	—	5
6	—	6	—	3
10	5	3	—	3
10-20	25	3	—	10
20+	10	16	—	12

EXHIBIT A-6

CONFIGURATION PREFERENCES

END USERS (CONT.)

CHARACTERISTIC	FRANCE	WEST GERMANY	B/N/L	TOTAL
LINK TO MAINFRAME				
- DIRECT	57	26	58	41
- MODE M	31	26	29	28
- INDEPENDENT/ NO LINK	-	3	-	2
- LINK TO MINIS	15	-	-	5

**APPENDIX B: SYSTEM/SOFTWARE HOUSE
CONFIGURATION PREFERENCES**

EXHIBIT B-1

CONFIGURATION PREFERENCES
SYSTEMS/SOFTWARE HOUSES

CONFIGURATION	FRANCE	W. GERMANY	BENELUX	TOTAL
MEMORY SIZE		%		%
16K	10	—	—	4.5
32	20	11	33	18
64	30	44	33	36
128	30	11	33	23
256	10	22	—	14
512	—	11	—	4.5
INCREMENTS TO MEMORY "YES"	30	100	34	62.5
16K	10	—	—	4
32	—	18	—	8
128	—	18	—	8
256	10	18	—	12.5
512	—	9	34	8
1 MEG	—	36	—	17
PRINTER "YES"	70	100	100	92
50 CPS	1	9	33	4
120 CPS	10	9	—	8
160 CPS	—	9	—	4
180 CPS	—	18	—	8
YES UNSPECIFIED				
200 LPM	10	—	—	—
300 LPM	50	36	33	36
600 LPM	—	18	—	8

EXHIBIT B-2

CONFIGURATION PREFERENCES (CONTD)
SYSTEMS/SOFTWARE HOUSES

CONFIGURATION	FRANCE	W. GERMANY	BENELUX	TOTAL
FLOPPY DISK				
UNSPECIFIED	20	58	33	32
125K	10	8	—	8
256K	—	33	—	16
50 MEG	10	—	—	4
2½ MEG	—	8	—	4
REMOVABLE DISK				
YES	70	75	—	67
5-10 MB	10	33	—	21
10 MB	30	8	—	17
20 MB	20	17	—	17
50 MB	—	17	—	8
FIXED DISKS				
YES	50	33	33	42
5 MEG	10	16	—	12.5
10 MEG	20	8	—	12.5
20 MB	10	—	—	4
500 MB	—	—	33	4
TAPE				
YES	30	42	—	35
800 BPI	—	—	—	—
1600 BPI	30	—	—	35
CARD READER				
80	—	33	—	17
96	—	—	—	—

EXHIBIT B-3

CONFIGURATION PREFERENCES (CONTD)
SYSTEMS/SOFTWARE HOUSES

CONFIGURATION	FRANCE	W. GERMANY	BENELUX	TOTAL
BADGE READER	10	8	-	5
OPTICAL READER				
YES UNDEFINED	20	-	-	-
OCR/B	10	-	-	-
VDUs				
YES	60	75	33	164
PAGE SIZE				
80c	-	-	33	4
1000	10	-	-	4
1920	20	67	-	40
2960	-	8	-	4
COMMUNIC. INTERFACE				
2780	30	8	33	20
3780	-	8	33	8
3270	-	8	33	8
X25	30	33	-	28
SYNCHRONOUS	10	42	-	24
ASYNCHRONOUS	20	25	-	20
BOTH A/S	30	25	-	24
TRANSPAC LINK	40	-	-	(21)
BUS CONTENTION	-	8	-	4
WORK STATIONS "YES"	40	92	-	60
NO. W/S				
1	10	8	-	8
2	10	8	-	8
4	10	8	-	8
5	-	8	-	4
40	-	8	-	4
200	-	8	-	4

EXHIBIT B-4

CONFIGURATION PREFERENCES (CONTD)
SYSTEMS/SOFTWARE HOUSES

CONFIGURATION	FRANCE	W. GERMANY	BENELUX	TOTAL
LINK TO MAINFRAME				
CPU	50	85	—	60
DIRECT	20	50	—	32
MODEM	30	33	—	28
INDEPENDENT	—	8	—	4

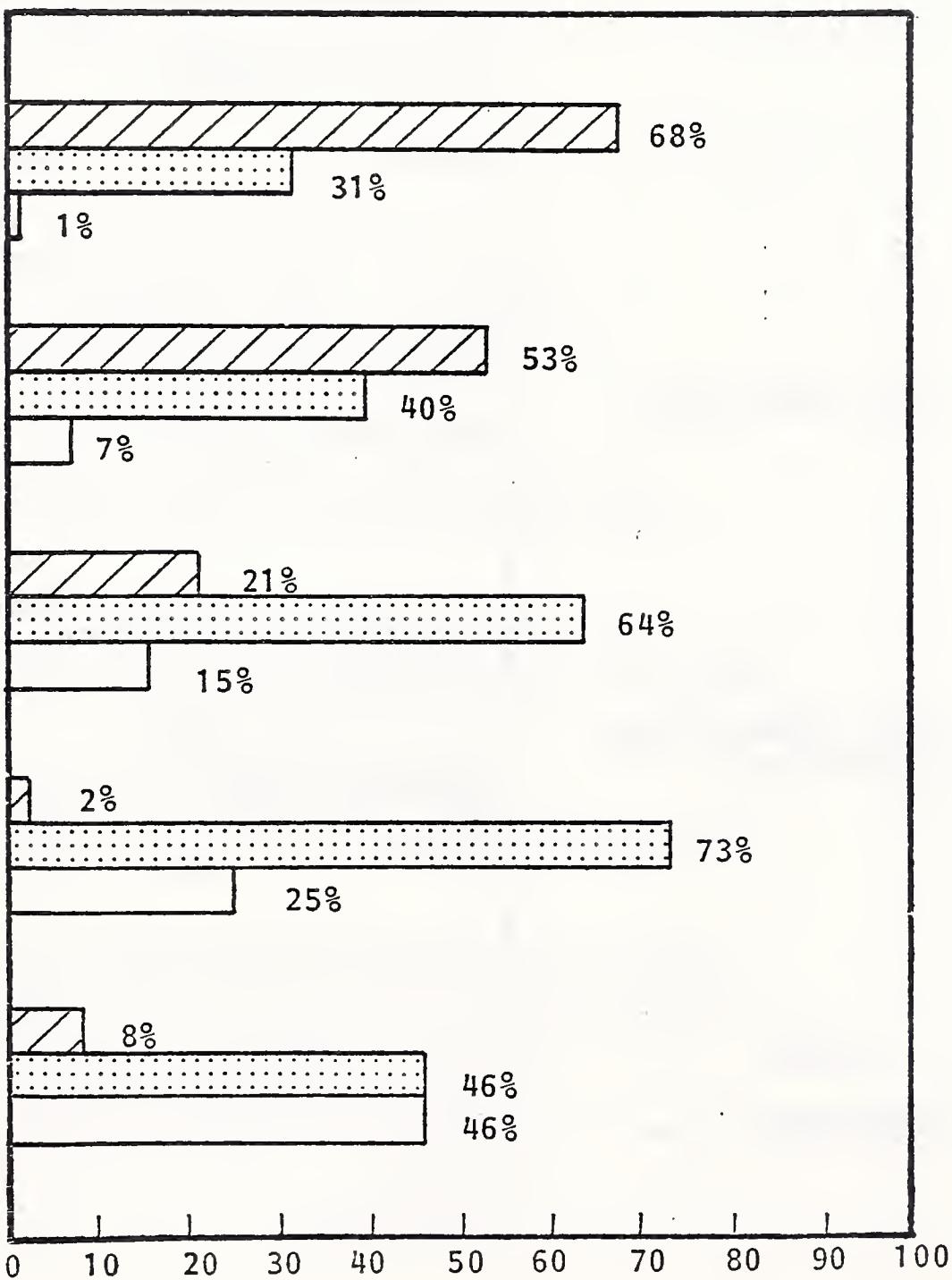
APPENDIX C: MAINTENANCE REQUIREMENTS

EXHIBIT C-1

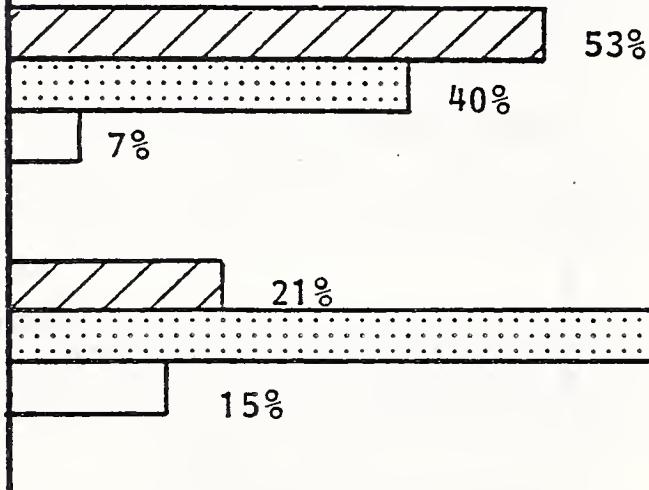
RESPONDENT USERS' RATING OF THE
IMPORTANCE OF FIELD MAINTENANCE CHARACTERISTICS

MAINTENANCE
CHARACTERISTICS

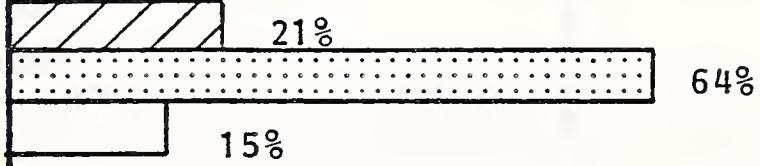
MEAN TIME TO RESPOND



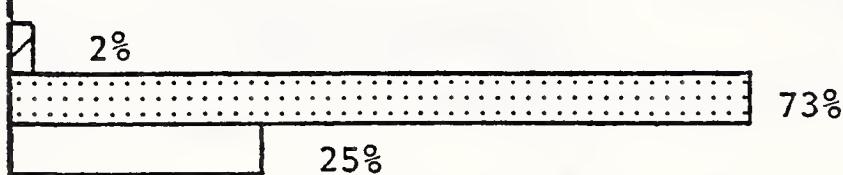
MEAN TIME TO REPAIR



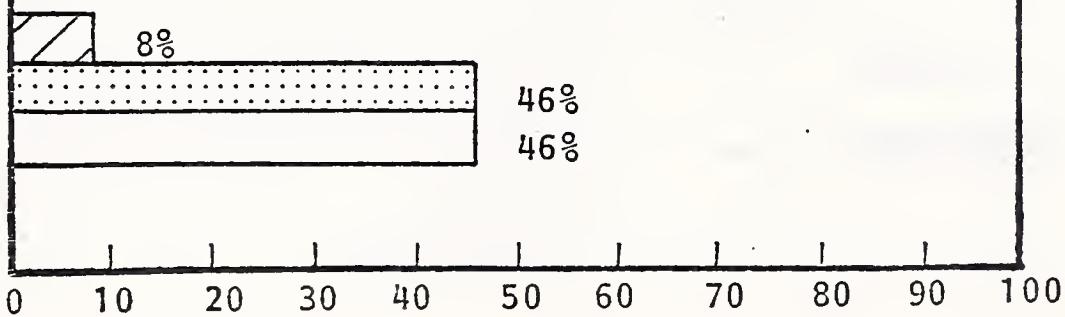
PREVENTIVE
MAINTENANCE



MAINTENANCE
EXPENSE



ACCOUNT CONTROL



PERCENTAGE REPLYING AFFIRMATIVELY

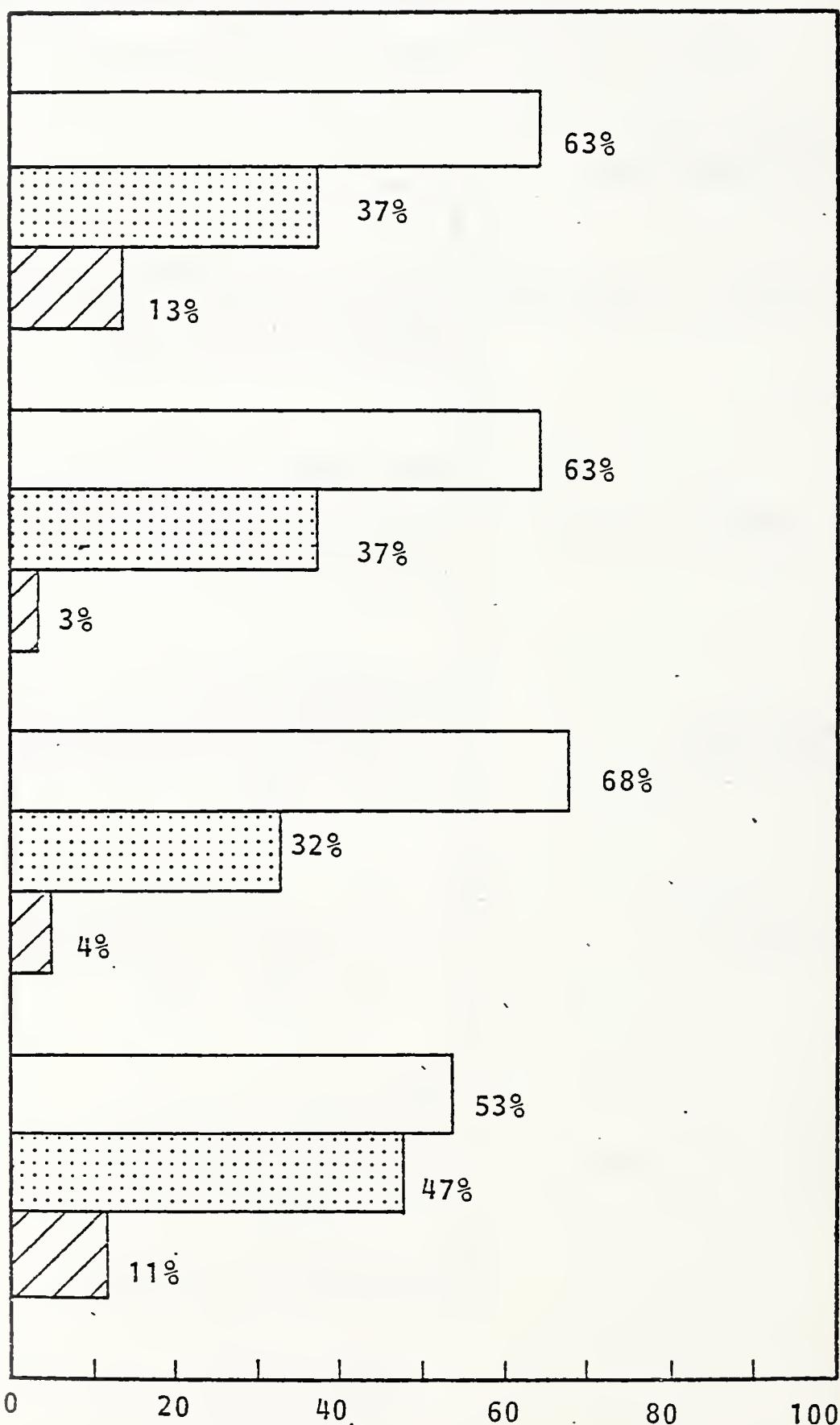
- VERY IMPORTANT
-
- NOT IMPORTANT

EXHIBIT C-2

RESPONDENT USER'S SATISFACTION/DISSATIS-
FACTION WITH MEAN TIME TO RESPOND
EUROPE

EQUIPMENT CLASS

MAINFRAMES



% SATISFIED

PERCENTAGE OF USERS RESPONDING



% DISSATISFIED



% OF DISSATISFIED
WILLING TO PAY MORE

EXHIBIT C-3

RESPONDENT USERS MINIMUM ACCEPTABLE
MEAN TIME TO RESPOND BY CLASS OF EQUIPMENT

EUROPE

EQUIPMENT TYPES

LARGE/MEDIUM
MAINFRAMES

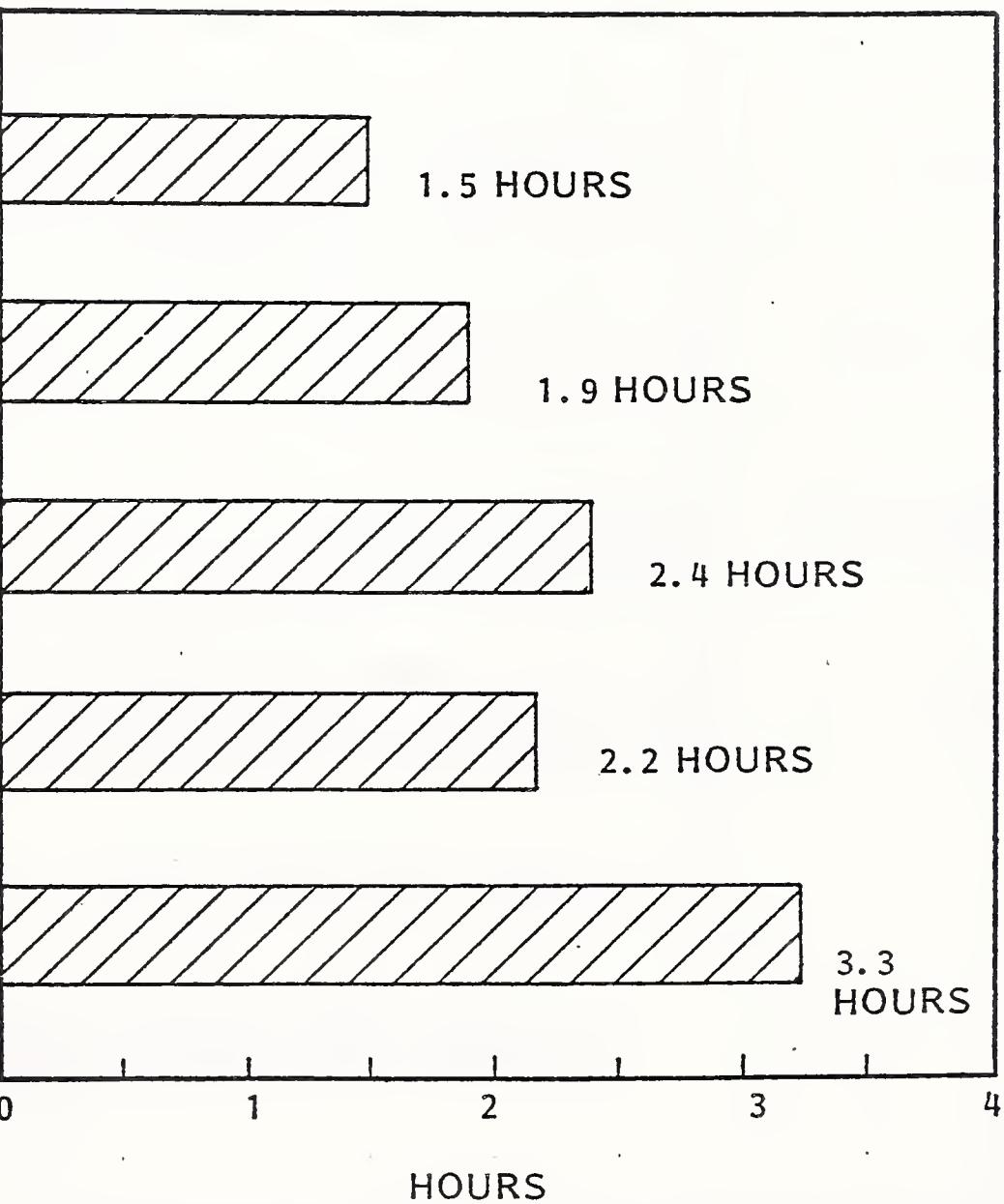


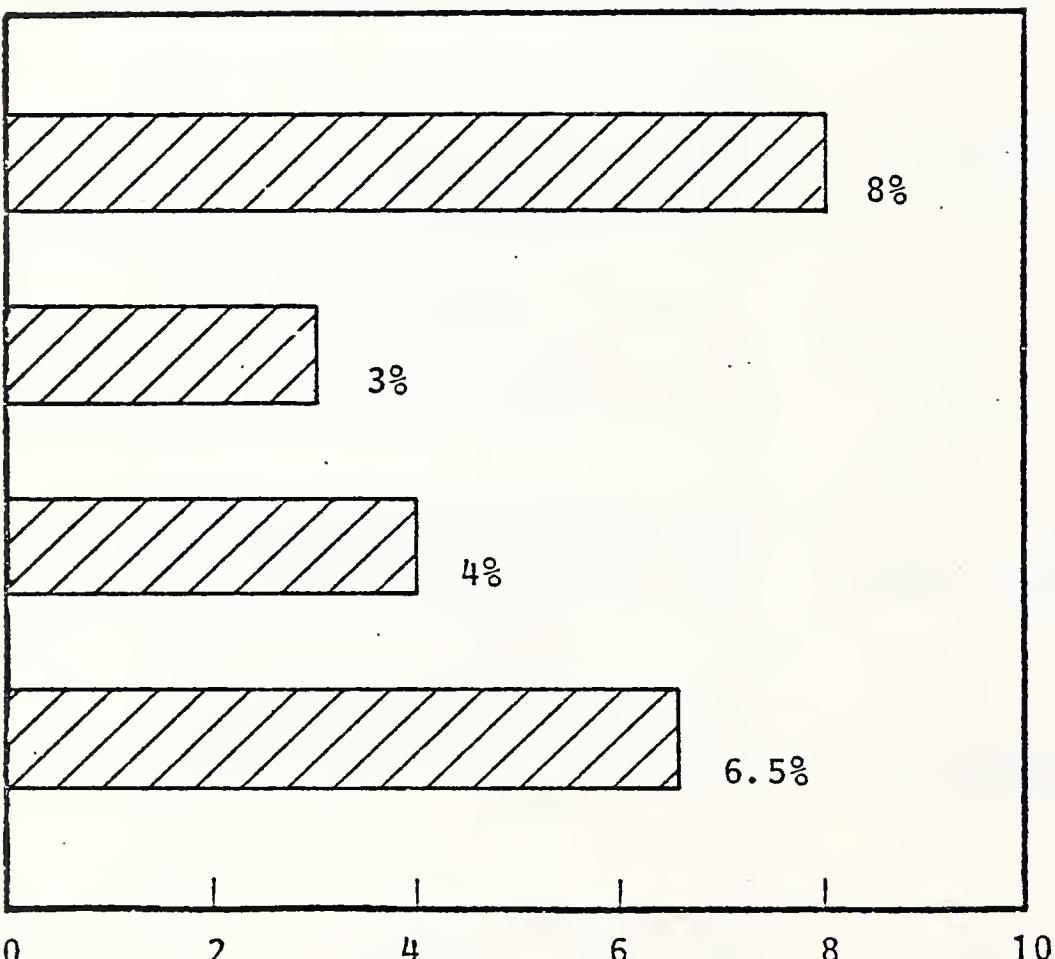
EXHIBIT C-4

AVERAGE ADDITIONAL PERCENTAGE RESPONDENT
USERS WOULD BE WILLING TO PAY FOR
IMPROVED RESPONSE TIME

EUROPE

EQUIPMENT CLASS

MAINFRAMES



AVERAGE ADDITIONAL PERCENTAGE

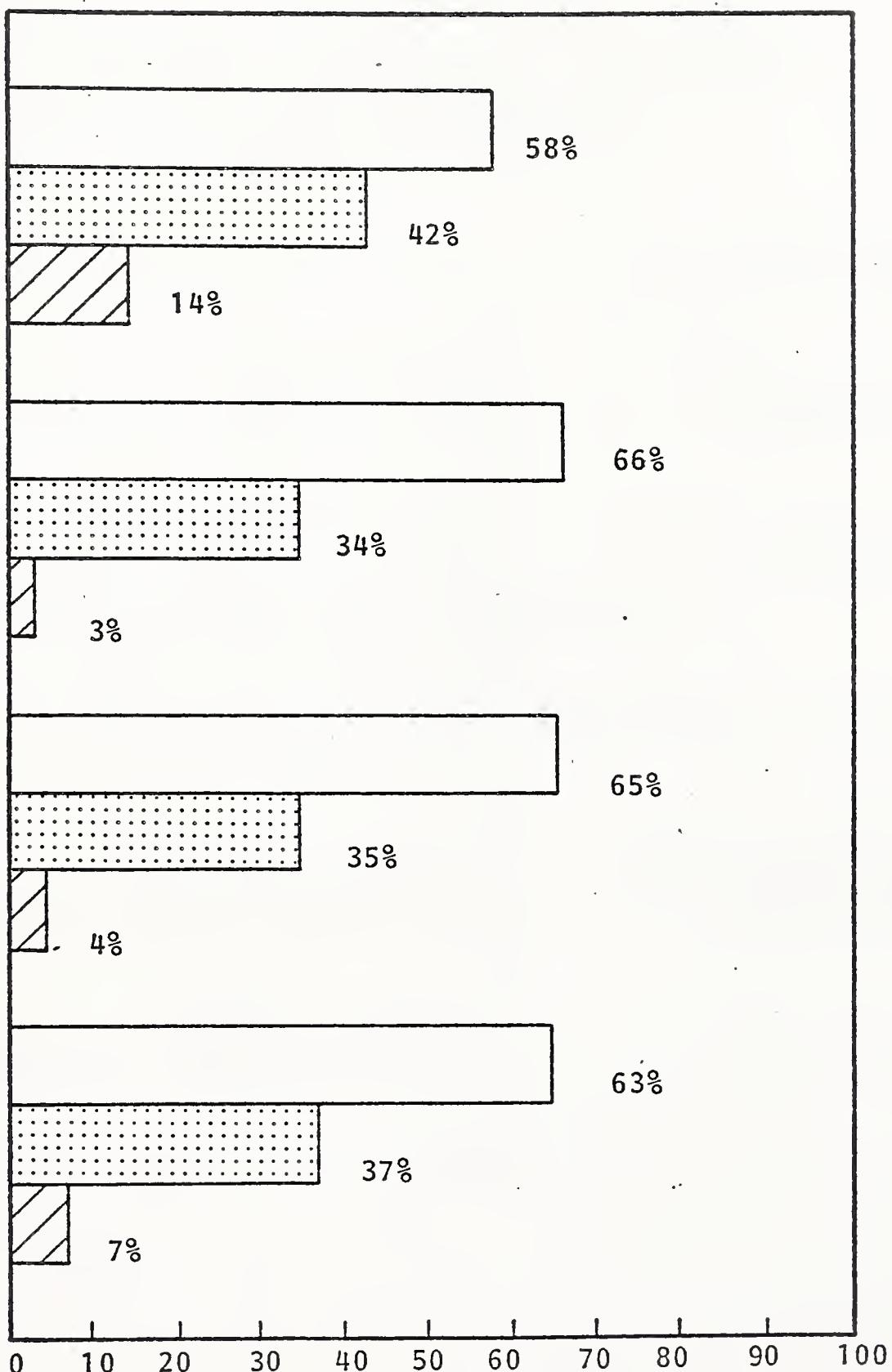
EXHIBIT C-5.

RESPONDENT USERS' SATISFACTION/DISSATISFACTION
WITH MEAN TIME TO REPAIR

EUROPE

EQUIPMENT CLASS

MAINFRAMES



PERCENTAGE OF USERS RESPONDING



% SATISFIED



% DISSATISFIED



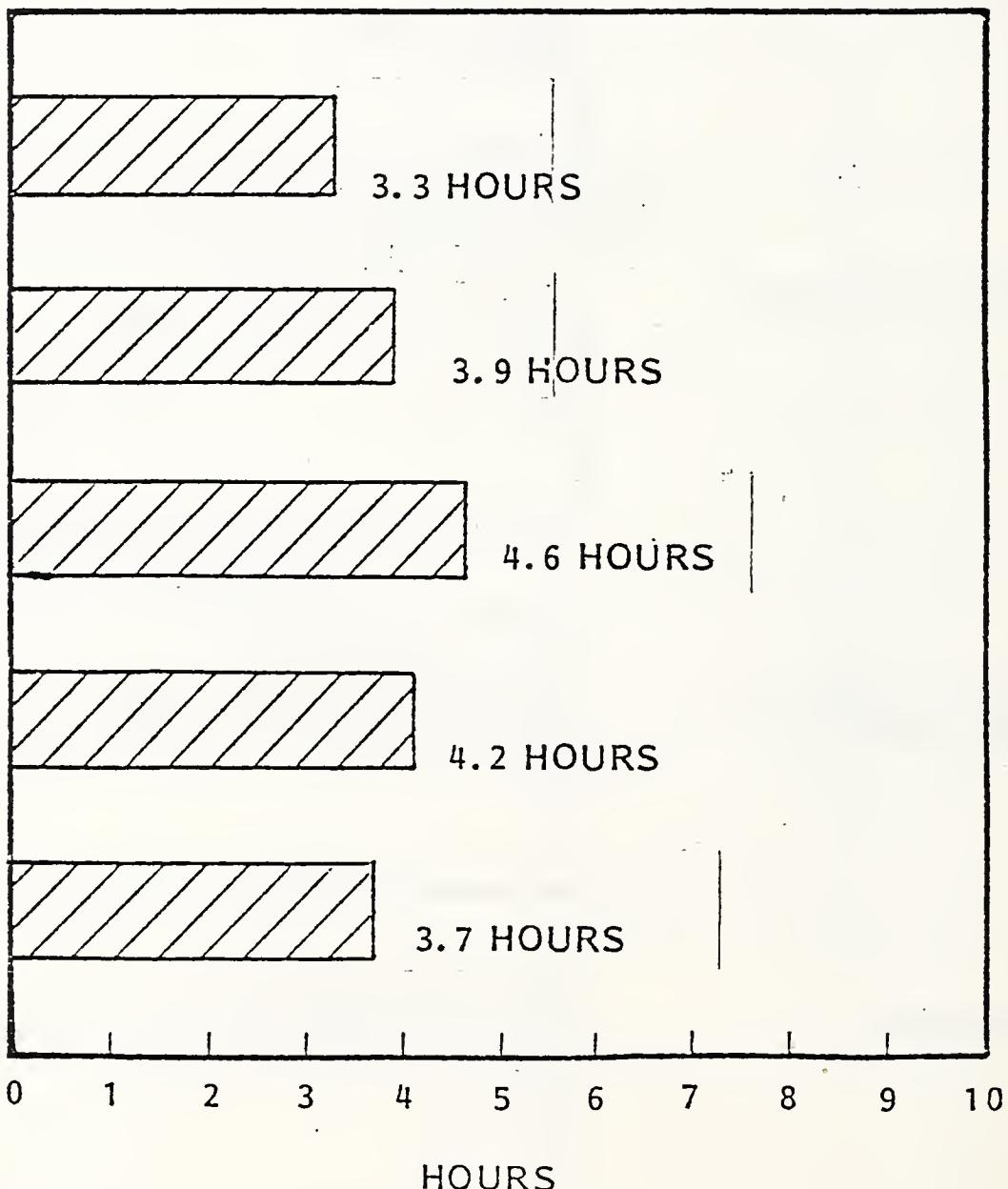
% OF DISSATISFIED
WILLING TO PAY MORE

EXHIBIT C-6

RESPONDENT USERS' MINIMUM ACCEPTABLE MEAN TIME
TO REPAIR BY CLASS OF EQUIPMENT
EUROPE

EQUIPMENT
CLASSIFICATION

LARGE/MEDIUM
MAINFRAMES



APPENDIX D: LARGE END USER QUESTIONNAIRE

1. What EDP equipment do you presently use?

<u>Manufacturer</u>	<u>Model</u>	<u>Quantity</u>	<u>Centralised</u>	<u>Distrib.</u>	<u>Network</u>
a)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. What use do you make of Small/Mini Computer Systems, in which Applications?

<u>Manufacturer</u>	<u>Model</u>	<u>Quantity</u>	<u>Application</u>

3. What is the Main Role that Small/Mini Computers Play in your Company?

- a. Reduced Administrative Costs b. Networking
- c. Speed up availability/distribution of information
- d. Improve quality of data available:
 - ↳ Financial Commercial
 - Production Management/Administration

4. How independent are you of the equipment manufacturer for the provision of minicomputer/small business system and application software?

SOFTWARE	MANUFACTURER	OWN STAFF %	THIRD PARTY %	% TOTAL
Basic/System				
Applications				
Network				

5. What was your 1978 EDP budget?

Value _____ Units _____
% of company turnover _____

6. How was this divided in 1978? And how will it change in 1979?

ITEM	Mainframe	Communication	Mini	Small Bus. System	Office Computer	Termin
• Hardware <ul style="list-style-type: none">- Rent- Lease- Purchase						
• Software <ul style="list-style-type: none">- Systems- Application- Network						
• Operations <ul style="list-style-type: none">- Analyst- Programmer- Operator- Maintenance						
• Other						

7. Do you have a need for minicomputers in any of the following areas?

(+)

Already use Need less (-) No foreseeable need

Process Control

Network node

Terminal Controller

Small Business System

Work Station

8. What are your requirements for small/mini systems? To fulfil which applicational needs?

<u>Application</u>	<u>Price Range</u>	<u>Type Preferred</u>	<u>Number Needed</u>	<u>Distribution</u>	<u>Centralised</u>	<u>Network</u>
a	_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b	_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c	_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d	_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e	_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. We would now like to examine your minicomputer hardware configuration preferences.

- Memory size (KB) : _____
- Memory increment (KB) : _____
- Printer, type : character _____ (speed) line _____ (speed)
- Floppy Disk : _____ (number) _____ capacity)
- Disk, type : - removable _____ (capacity) _____ (No.)
 - fixed _____ (capacity) _____ (No.)
- Tape, type : 800 bpi 1600 bpi
- Card reader : 80 col 96 col
- Badge reader :
- Optical reader _____ (code : OCRA/B/other)
- Visual display _____ (page size) _____ (No.)
- Communications interface : 2780 3780 3270
 x 25 Bus contention telex
x Synchronous _____ (type)
> Asynchronous _____ (type)
- Workstations : _____ (number) _____ (type)
- link to CPU : direct modem
↳ _____ (minimum distance)
- describe configuration : _____
- Other _____

10. What environment will be likely ?

dry wet dusty office

11. How would you prefer file back-up/saving to occur ?

on disk on floppy disk on tape other

12. Would you prefer that the hardware vendor propose a list of system/
software houses to assist installation ?

yes no

13. Is upwards compatibility of the small minicomputer with other
models of the same line important?

yes no

14. Is compatibility desirable with other hardware?

Make/Model _____

15. Can this compatibility be handled by

monoprogramming dual programming multi programming

16. How many concurrent programs would be executed ? _____

17. What system software functions are necessary ? (e.g. dynamic memory allocation,
job priority handling, etc.) _____

18. What languages would you prefer ? (COBOL, FORTRAN, BASIC, APL etc., give
version e.g. FORTRAN IV, H etc.)

19. What file management methods would you prefer ?

sequential direct indexed sequential _____ (ot)
 compatibility with _____

20. Is a database management system required ?

yes no

↳ preference (type) _____

21. On the basis of what do you judge a minicomputer vendor ? (1-8 high-low)

✓ hardware performance hardware flexibility
 ease of use reliability of system
 maintenance cost vendors name
 _____ other

22. Would you use a system/software house for :

choice of vendor application software development
 file, programme conversion test data

23. Do you/would you use a computer services company for excess workload processing , yes no

24. Would you accept to maintain small minicomputers yourself ?
 run diagnostic exchange boards
 fetch spare parts from central vendor location

25. Would you be willing to deal with a third party maintenance vendor ?

26 Identify shortcomings of present minicomputer/small business products you have and how you would like to see them resolved .

27 What price level are you willing to pay for the small Mini Computer you have defined in this questionnaire?

28. What sort of contract do you prefer for rental (if any)

1 year 2 year 3 year other

29. Would you prefer contract to be all inclusive or separately tariffed?

	All one Contract	<u>Quoted</u> <u>Separately</u>	By level of service
Basic hardware	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Optional extras	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Software (basic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Applications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Installation support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conversion (if any)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

30) Are volume discounts important or would you prefer realistic pricing of solutions offered for your needs?

Discount is not important if problem is solved

Discount sometimes required : minimum quantity _____

Discount necessary : % range _____ minimum required _____

Comments _____

31. Have current prices stopped you from applying minicomputers to existing needs ?

yes no

*Cost must be below :

• Areas concerned : _____

* Costs quoted above include : _____

32. Small business/minicomputers systems may be designed differently in the future. For example, a standard interface for all of your EDP systems would eliminate the need for the revision of software or re-designing your system every time you change your risks or your terminals etc. Do you have any thoughts about how you would like to see minicomputers/small business systems designed ?

Thank you for your time. Would you be willing to provide further comments directly to the Manufacturer?

Yes No

APPENDIX E: SYSTEMS/SOFTWARE HOUSE QUESTIONNAIRE

SOFTWARE/SYSTEMS HOUSE INTERVIEW

- An increasing proportion of minicomputer products are being sold through organisations like yourselves who:
 - implement the application software support for users who do not have their own programming staff or who lack the required expertise
 - sell the hardware as a package along with your own software products
 - integrate the minicomputer and other specialized hardware devices with the systems/applications software from other sources.
- Depending on the vendor, as much as 80% of the mini computer units distributed in a country can be sold through companies like yours. It is therefore natural that your advice and opinions should be sought by a vendor who is planning the introduction of a new minicomputer product; this is the objective of this interview.
- Uppermost in our priorities is the establishment of the applications that are open to a low-end micro/minicomputer, how the product should be packaged (peripherals, memory size, basic software, languages, extensions) the level of support you would be capable of providing etc.
- Please feel free to express criticism of past or existing products: this will highlight problems which the new product may be able to solve.
- If you so desire, INPUT can put you in touch with the manufacturer for further discussion where necessary.

SYSTEM/SOFTWARE HOUSE INTERVIEW

1. Which minicomputer products do you presently use?

<u>RANK</u>	<u>VENDOR</u>	<u>Turnkey</u>	<u>H/W Int.</u>	<u>SP Sales</u>	<u>Design/ Prog</u>	<u>Recommen-</u>
1	_____	<input type="checkbox"/>				
2.	_____	<input type="checkbox"/>				
3.	_____	<input type="checkbox"/>				
4.	_____	<input type="checkbox"/>				
5.	_____	<input type="checkbox"/>				

2. Which models do you mainly use and what is the approximate volume of business

3. What are the key minicomputer application areas that you implement in the market and how are they serviced ?

4. How independent are you of the minicomputer manufacturer for the provision of minicomputer system and application software ?

<u>SOFTWARE</u>	<u>MANUFACTURER</u>	<u>OWN STAFF %</u>	<u>THIRD PARTY %</u>	<u>% TOTAL</u>
-----------------	---------------------	--------------------	----------------------	----------------

BASIC/SYSTEM

APPLICATION

NETWORK

5. Are you contractually committed to one or more minicomputer vendors?
If so how ?

<u>VENDOR</u>	<u>TYPE OF CONTRACT</u>	<u>COMMENTS</u>
---------------	-------------------------	-----------------

6. Identify shortcomings of present low-end minicomputers products as you see them and how you would like to see them resolved.

7. Would you accept to maintain small minicomputers hardware yourself ?

No Yes run diagnostics

exchange boards

fetch spare parts from central vendor location

fetch spare parts from local vendor location

8. How do you prefer to finance your small EDP equipment?

	<u>Prefer</u>	<u>Sometimes</u>	<u>Never</u>	<u>Comments</u>
--	---------------	------------------	--------------	-----------------

Purchase

Lease

Rent

9. Would you prefer contract to be all inclusive or separately tariffed?

	All one Contract	Quoted Separately	By level of service
Basic hardware	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Optional extras	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Software (basic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Applications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Installation support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conversion (if any)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. We would now like to examine your hardware configuration preferences by application.

- Memory size (KB) : _____
- Memory increment (KB) : _____
- Printer, type : character _____ (speed) line _____ (speed)
- Floppy Disk : _____ (number) _____ capacity
- Disk, type : - removable _____ (capacity) _____ (No.)
 - fixed _____ (capacity) _____ (No.)
- Tape, type : 800 bpi 1600 bpi
- Card reader : 80 col 96 col
- Badge reader :
- Optical reader _____ (code : OCRA/B/other)
- Visual display _____ (page size) _____ (No.)
- Communications interface : 2780 3780 3270
 x 25 Bus contention telex
 Synchronous _____ (type)
 Asynchronous _____ (type)
- Workstations : _____ (number) _____ (type)
- - link to CPU : direct modem
 _____ (minimum distance)
- - describe configuration : _____
- Other _____

11. What environment will be likely ?

dry wet dusty office

12. How would you prefer file back-up/saving to occur ?

on disk | fixed | on floppy disk on tape other
removable

Should the back up be automatic? yes no

13. Would you prefer that the hardware vendor propose a list of system/
software houses to assist installation ?

yes no

14 Is upwards compatibility desirable with larger minicomputers ?

yes no

↳ which make/model , _____

Is the compatibility required in ?

Hardware Software

15 What sort of operating system is required ?

monoprogramming dual programming multi programming

16 Which type of applications, if any, need to be executed Concurrently?

17. What system software functions are necessary ? (e.g. dynamic memory allocation,
job priority handling, etc.) _____

18. What languages would you prefer? (RPG COBOL, FORTRAN, BASIC, APL etc., give
version e.g. FORTRAN IV, H etc.) _____

19. What file management methods would you prefer ?

sequential direct indexed sequential _____ (other)
 compatibility with _____

20. Is a database management system required ?

yes no

↳ preference (type) _____

21. On the basis of what do you judge a minicomputer vendor ? (1-8 high-low)

<input type="checkbox"/> hardware performance	<input type="checkbox"/> hardware flexibility
<input type="checkbox"/> ease of use	<input type="checkbox"/> reliability of system
<input type="checkbox"/> maintenance	<input type="checkbox"/> cost
<input type="checkbox"/> _____ other	<input type="checkbox"/> vendors name

22. Have current prices stopped you from applying minicomputers to existing needs ?

yes no

*Cost must be below :

• Areas concerned : _____

* Costs quoted above include : _____

23. What level of volume discounts do you usually expect for low-end mini-computers ?

VOLUME RANGE

DISCOUNT RANGE

24. What delivery cycle do you need and in what volume do you usually order ?

25. Would you be willing to discuss your requirements further with the manufacturer

Yes No

Thank you for your time

APPENDIX F: VENDOR QUESTIONNAIRE

VENDOR INTERVIEW

Version 1/26.2.79

LEAD IN

- The distinction between microcomputers and minicomputers is a tenuous one and usually centres on the ability of compute, I/O and storage functions being integrated on a single chip.
- Most importantly, the small micro/minicomputer system market is evolving rapidly in price (decreasing) performance (increasing) and function (multiplying) and this evolution is being tied into the concept of minicomputer "families" or line of compatible products.
- Distribution of these small margin/high volume products is also fundamental, and determines the ability of a vendor to profitably participate in this market.
- INPUT is attempting to discern how this low end of the minicomputer market will be treated over the next five years and would like your views on how you see the market and its support evolving between now and 1983.

1. (How) do you distinguish between a microcomputer and a minicomputer. ?

2. How low (in price) will the minicomputer go over the next five years and how will performance increase ?

	\$	<u>Performance (cycle time ns)</u>
1979	_____	_____
1981	_____	_____
1983	_____	_____

3. Will there be a microcomputer market, distinct from the minicomputer market

No

Yes Please give \$ ranges _____

4. Describe a typical configuration of a low-and. compatible micro/mini as you see it today 1981 1983

CPU cycle time (ns) _____ _____ _____

Memory size (MB) _____ _____ _____

Disk : fixed (F)
removable (R)
floppy (FD) _____ _____ _____

Disk storage (MB) _____ _____ _____

Printer performance
(cps/lpm) _____ _____ _____

Work stations : types
keyboard/printer (KP),
CRT _____ _____ _____

Work stations number _____ _____ _____

Work stations expansion
(e.g. %) _____ _____ _____

Other _____ _____ _____

5. Describe a typical system software support

Comments : _____

7. Since the margin on hardware will be small, how do you see the sales/distribution of these low-end products occurring?

% own sales network % OEM systems house

% OEM software house % Computer shop

% Other _____ % Other _____

(Total 100%)

(Total 100%)

8. What important technology developments, that impact this market, do you see occurring in :

1979 1981 1983

9. Can you briefly describe the architecture that you think will be prevalent ? _____

10. Can you describe the packaging that you think will be prevalent ? _____

11. How will network connection and communications handling occur on this product ?

single, fixed procedure (name) _____

many, fixed procedures (names) _____

many variable procedures, principally _____
(Examples : IBM 2780/3780/3270, packet switching, bus convention)

12. How will programming be handled ?

by the vendor (variable) by the vendor (black box)

by the third party by the user

13. Using which principal languages ? _____

14. Do you believe it will be possible to separately price

basic system software compilers/languages

Application software software maintenance

Customized hardware maintenance other _____

15. How will product maintenance be handled ?

by vendor, on call by distributor

by third party maintenance by user

Please comment on the trends in usage of the above _____

16. In which major areas do you think that the European market will differ from that of the U.S. ?

Thank you for your time

